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ABSTRACT

The objectives of this seminar held at the Universiti Pertanian Malaysia for teacher training in environmental education were as follows: (1) to familiarize teacher educators with the content of the series of teacher training modules in environmental education prepared by the UNESCO International Environmental Education Programme (IEEP); (2) to prepare prototype environmental education units for incorporation into teacher training programs; (3) to identify institutions for local adaptation and use of teacher training modules in participating member states; (4) to identify activities and documents on teacher training in environmental education to be undertaken by IEEP at subregional, regional, and international levels; and (5) to enhance exchange of information and experience in the development of teacher training in environmental education in the subregion. The document includes a summary of the proceedings of the seminar; presentation on the UNESCO-UNEP International Environmental Education Programme (IEEP); presentation and discussion of country reports (a general summary); presentation and discussion of working documents; a brief account of prototype environmental education units developed by the seminar for incorporation into the teacher training program; a list of suggested documents and activities on the incorporation of environmental education into teacher education to be developed by IEEP at subregional and international levels; suggested methods and institutions for utilization of the modules; and a conclusion. (DB)

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FINAL REPORT

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I. INTRODUCTION

Background and Preparation

The Subregional Seminar on Teacher Training in Environmental Education for Asia was conceived in the context of UNESCO's approved Programme and Budget for 1986-1987. The Seminar was organized by the Faculty of Educational Studies of Universiti Pertanian Malaysia in collaboration with UNESCO-UNEP International Environmental Education Programme (IEEP).

UNESCO prepared the objectives, agenda, draft invitation letters, information note, and working documents of the seminar and identified Member States to be invited to send their respective participants to the seminar. UNESCO provided the needed funds for the preparation and organisation of the seminar. Dr. Abdul Ghafoor Ghaznawi, Programme Specialist in Environmental Education, UNESCO, Paris coordinated the organisation of the seminar and provided its technical and advisory support.

The Faculty of Educational Studies of Universiti Pertanian Malaysia (UPM) issued invitations, provided air travel tickets, took charge of arrival and departure of participants, provided accommodation and incidental expenses, arranged field excursions, and provided local transportation. Secretarial services and administrative support as well as conference rooms were also provided by the Faculty of Educational Services.

UPM had set up a nine member Central Committee for the preparation of the seminar. The members were from Universiti Pertanian Malaysia; Department of Environment of the Ministry of Science, Technology and Environment; Teacher Education Division, Ministry of Education; Malaysian National Commission for UNESCO; and Curriculum Development Centre, Ministry of Education (see Appendix 1). An Organising Working Committee from Universiti Pertanian Malaysia consisting of 28 persons under the Chairmanship of Dr. Kamariah Hj. Abu Bakar was also set up. This committee was responsible for the daily planning, and the organisational and administrative aspects of the seminar (for the timetable of work see Appendix 2).

Objectives

The objectives of the seminar were as follows:

1. to familiarise teacher educators with the contents of the series of teacher training modules in environmental education prepared by IEEP;
2. to prepare prototype environmental education units for incorporation into teacher training programmes;
3. to identify institutions for local adaptation and use of teacher training modules in participating Member States;
4. to identify activities and documents on teacher training in environmental education to be undertaken by IEEP at subregional, regional and international levels;
5. to enhance exchange of information and experience in the development of teacher training in environmental education in the subregion.

Date and Venue

The seminar was held in the Universiti Pertanian Malaysia from 15 to 22 November, 1987.

Participants

Member States invited to the seminar were Bangladesh, India, Indonesia, Malaysia, Philippines, Sri Lanka and Thailand. However, Bangladesh and India were unable to send their representatives. Fifteen participants and observers attended the seminar (see Appendix 3.).

Working Documents

Seven documents on teacher training in environmental education prepared by UNESCO and five country reports prepared by the participants were presented and discussed at the seminar (see Appendix 4 and 4.1).

Bureau of the Seminar

The following bureau members were elected:

Chairman : Mr. Nagendralingan Ratnavadivel (Malaysia)
Vice-Chairman : Mr. N.S.R. DeSilva (Sri Lanka)
Rapporteur : Dr. Leticia Pojun Cortes (Philippines)

Steering Committee

The following persons served on the Steering Committee:

Chairman : Dr. Abdul Ghafoor Ghaznawi
Dr. Kamariah Hj. Abu Bakar

Members : Mr. Nagendralingan Ratnavadivel
Mr. N.S.R. deSilva
Dr. Leticia Pojun Cortes
Dr. Sharifah Mohd Nor

Resource Persons

The following served as resource persons in the presentation and discussion of seminar documents:

Prof. Dato' Dr. Ariffin Suhaimi — Deputy Vice-Chancellor
International Islamic University

Dr. Khalid Mohd Nor — Deputy Vice-Chancellor
Universiti Pertanian Malaysia

Mr. Mokhtar Hj. Nawawi — University Pertanian Malaysia

Dr. Siti Hawa Ahmad — Curriculum Development Centre
Ministry of Education Malaysia

- | | |
|----------------------------------|--|
| Dr. Ahmad Badri Mohamad | — Universiti Kebangsaan Malaysia |
| Miss Indra Somasundram | — Seri Kota Teachers College
Malaysia |
| Assoc. Prof. Lily Chew | — Universiti Malaya |
| Assoc. Prof. Dr. Thilla Chelliah | — Universiti Malaya |
| Dr. Abdul Ghafoor Ghaznawi | — UNESCO, Paris |

Agenda

1. Opening of the seminar
2. Presentation on UNESCO-UNEP International Environmental Education Programme
3. Presentation of Country Reports
4. Presentation of the IEEP Module: Strategies for the Training of Teachers in Environmental Education
5. Presentation of training modules for primary school teachers and supervisors in environmental education
 - a. Environmental Education: Module for Pre-service Training of Teachers and Supervisors for Primary Schools
 - b. Environmental Education: Module for In-service Training of Teachers and Supervisors for Primary Schools
6. Presentation of training modules for secondary school science teachers and supervisors in environmental education
 - a. Environmental Education: Module for Pre-service Training of Science Teachers and Supervisors for Secondary Schools
 - b. Environmental Education: Module for In-service Training of Science Teachers and Supervisors for Secondary Schools
7. Presentation of training modules for secondary school social science teachers and supervisors
 - a. Environmental Education: Module for Pre-service Training of Social Science Teachers and Supervisors for Secondary Schools
 - b. Environmental Education: Module for In-service Training of Social Science Teachers and Supervisors for Secondary Schools
8. Workshop I: Development of prototype environmental education teaching units
9. Workshop II.: Suggested documents and activities in teacher training in environmental education to be developed by IEEP at subregional, regional, and international levels
10. Workshop III.: Suggested methods and institutions for the utilization of the environmental education training modules
11. Closing of the seminar-workshop

II. PROCEEDINGS OF THE SEMINAR

Opening Session

The opening session was chaired by Assoc. Prof. Mohd Shah Hj. Lassim, Dean, Faculty of Educational Studies of the Universiti Pertanian Malaysia (UPM) and attended by the Deputy Vice-Chancellor and academic staff members of UPM, staff members of the Ministry of Education and the Ministry of Science, Technology and Environment of Malaysia, the Malaysian National Commission for UNESCO, staff members from the University of Malaya and the Universiti Kebangsaan Malaysia, and participants from the region.

Welcoming addresses were made by the Chairman of the opening session, Dr. Abdul Ghafoor Ghaznawi of UNESCO, Paris and Dr. Leo Michael Toyad, the Honourable Deputy Minister of Education of Malaysia. In his welcoming address, the Chairman highlighted the subject of a clean environment and healthy living as being a universal issue. The deliberations in the seminar will be on similar issues with a slight difference of narrowing down the discussions to the grassroot level in an attempt to study various strategies that teachers may use in fostering and inculcating environmental consciousness among children through the school curriculum in the region.

The chairman articulated the fervent hope and aspiration of the sponsors and organisers expressing them through the objectives of the seminar which are to

1. study strategies in curriculum development and teacher training in environmental education,
2. familiarise teacher educators with the content of the pre-service and in-service teacher training modules in environmental education prepared by UNESCO-UNEP International Environmental Education Programme (IEEP),
3. explore efficient ways of using the teacher training modules and identify institutions for local adaptation and use in the participating member states, and
4. identify documents and activities for teacher training in environmental education to be developed by the IEEP

In welcoming all participants, especially the foreign guests, the Chairman conveyed his deepest gratitude to UNESCO for entrusting the Universiti Pertanian Malaysia with the task of organising the seminar-cum-workshop, granting it full sponsorship including the necessary funding to make the seminar-workshop a success. Grateful thanks were also accorded especially to Dr. Abdul Ghafoor Ghaznawi, the UNESCO's representative from the Headquarters in Paris for his effort in seeing that the proposed seminar is realised, and for his part in presenting papers and contributions. In his conclusion the chairman looked forward to a fruitful discussion and invaluable contributions from all participants (for full text, see Appendix 5)

In his opening session statement Dr. A.G. Ghaznawi stressed the significance of the seminar and put emphasis on the achievement of its objectives. Dr. A.G. Ghaznawi stated that inputs to the seminar shall consist of seven documents on teacher training in environmental education prepared under UNESCO-UNEP International Environmental Education Programme (IEEP) by teams of teacher educators from Jamaica, India, Australia, USA, Kenya, and the Philippines. These were tested in two subregional teacher training workshops in environmental education in Jamaica and India in 1983.

He further stressed that the most important achievement shall be the commitments that may be developed among the teacher educators who, as a result of this seminar, would hope-

fully be taking necessary actions to incorporate environmental education into their ongoing teacher education courses and into the full spectrum of their respective teacher education systems when the appropriate occasions arise.

Dr. A.G. Ghaznawi went further to mention that the environment with its dynamic nature continually changes and develops towards a more stable holistic state. Studies in environmental dimensions are currently the frontiers of knowledge that challenge environmental scientists, sociologists, technologists, researchers, politicians, etc. The attainment of this new knowledge is essential for a better understanding of the holistic nature of the environment of the inter-relationships and interdependencies of its components including that of man and his sound intervention in the environment for sustainable development. Environmental education was defined as a profound educational renewal process through which this knowledge is processed and transmitted to humanity. It aims for the well-being of the present and future generations. It necessitates a move to embark on curriculum and teacher education renewal to assume the responsibility for the dissemination of environmental knowledge through the teaching/learning processes at different age levels.

Dr. A. Ghaznawi went on to stress that UNESCO has taken numerous actions towards the development of environmental education in the last decade among which are the preparation and organisation of a series of international, regional, subregional, and national training seminars and workshops for key educational personnel on the development of environmental education.

The UNESCO representative expressed his deepest gratitude and appreciation to the Government of Malaysia, the Malaysian National Commission for UNESCO, Universiti Pertanian Malaysia especially to Faculty of Educational Studies for facilitating the organisation of this seminar. Dr. A.G. Ghaznawi also thanked the Member States for accepting the invitation and for sending experts from their educational institutions (for full text, see Appendix 6).

Dr. Leo Michael Toyad, the Honourable Deputy Minister of Education stressed his concern over the widespread ignorance and apathy amongst the general public and industrial sectors regarding environmental degradation. This attitude, he said, had resulted in pollution of waterways in the country which has incurred high cost of cleaning up for the government.

However, with the enactment of the Environmental Quality Act of 1973, the pollution problems have improved remarkably. Nevertheless, it is hoped that industries would take initiatives to voluntarily protect the environment from pollutants. He further remarked that with economic development there should be an ethical obligation to conserve the environment.

The Honourable Deputy Minister of Education strongly believes that through education of the public these desired changes will be a reality. For these tasks, educators must equip themselves with the necessary tools in order to inculcate awareness and appreciation of our environment. In Malaysia, under the primary school curriculum, an innovative step of integrating environment into a subject "Alam dan Manusia" (Man and His Environment) had been started. In this respect, teacher training institutions have an important role to play in the preparation of teachers for effectively teaching the environmental education dimension of the curriculum. He hoped, as the result of the seminar, the respective institutions will embark on programmes for teaching environmental education. The Honourable Deputy Minister also stressed the importance of the mass media's supportive role in educating the public.

With respect to the seminar, the Honourable Deputy Minister called for more similar linkages and cooperation among Asian nations in the struggle for a better quality of life in this world.

In his concluding statement, the Honourable Deputy Minister wished the participants a fruitful time in their five days of deliberations and undertakings and declared the seminar open (for full text, see Appendix 7).

Plenary and Group Sessions

Plenary Sessions

Under the chairmanship of Professor Dato Dr. Ariffin Suhaimi, Deputy Vice-Chancellor of the International Islamic University, a presentation on the background, objectives and activities of UNESCO-UNEP International Environmental Education Programme, was made by Dr. Abdul Ghafoor Ghaznawi. This was followed by the election of the Bureau of the Seminar under the chairmanship of Dr. Kamariah Hj. Abu Bakar, Faculty of Educational Studies, Universiti Pertanian Malaysia and the Chairman of the Organising Working Committee.

Mr. Nagendralingan Ratnavadivel chaired the plenary sessions of 16 November 1987 which were devoted to the presentation and discussion of country reports from Indonesia, Malaysia, Philippines, Sri Lanka, and Thailand.

Assoc. Prof. Dr. Khalid Mohd. Nor, Deputy Vice-Chancellor of Universiti Pertanian Malaysia chaired the plenary session on 17 November 1987 in which the document entitled "Strategies for the Training of Teachers in Environmental Education" was presented by Dr. Abdul Ghafoor Ghaznawi. This was followed by sessions under the chairmanship of Mr. N.S.R. De Silva during which two documents were presented. The first entitled "Environmental Education: Module for Pre-service Training of Teachers and Supervisors for Primary Schools" was presented by Mr. Mokhtar Hj. Nawawi of Universiti Pertanian Malaysia. The second document entitled "Environmental Education: Module for In-service Training of Teachers and Supervisors for Primary Schools" was presented by Dr. Siti Hawa Ahmad of the Curriculum Development Centre, Ministry of Education, Malaysia.

Dr. Ahmad Badri Mohamad of the Universiti Kebangsaan Malaysia presented the document entitled "Environmental Education: Module for Pre-service Training of Secondary Science Teachers and Supervisors." This was followed by the presentation of the document entitled "Environmental Education: Module for In-service Training of Science Teachers and Supervisors for Secondary Schools" by Miss Indra Somasundram of Seri Kota Teachers College, Malaysia. Both of these presentations were made in the morning sessions of 18 November 1987 chaired by Mr. Nagendralingan Ratnavadivel.

In the morning plenary sessions of 19 November 1987 with the Chairman and Vice-Chairman of the Seminar presiding, the document entitled "Environmental Education: Module for Pre-service Training for Secondary Social Science Teachers and Supervisors" was presented by Assoc. Prof. Lily Chew of the University of Malaya followed by the presentation by Assoc. Prof. Dr. Thilla Chelliah, University of Malaya on the document entitled "Environmental Education: Module for In-service Training of Social Science Teachers and Supervisors for Secondary Schools." This was followed by a brainstorming session on suggested activities and documents on teacher training on environmental education for development by IEEP.

Group Sessions

On the afternoon of 17, 18 and 19 November 1987, the seminar participants were divided into working groups I and II. Each working group prepared a prototype unit on environmental education for infusion into ongoing pre-service or in-service teacher training courses. Each prototype unit was based on the working documents presented and discussed in the morning of that day. Thus each group prepared three prototype environmental education units for primary,

secondary science and secondary social science teacher training. These six prototype units are integrated as Item VI in this final report.

Appropriate excursions were arranged for the late afternoon of 16, 17, 18 and 19 and for the whole day of 20 November 1987. Participants were hosted at dinners by the Chief Ministers of Negeri Sembilan and Malacca on 18 and 20 November 1987, respectively (for report on excursions, see Appendix 8).

Closing Session

The closing session was convened under the chairmanship of Assoc. Prof. Mohd Shah Hj Lassim, Dean, Faculty of Educational Studies in the presence of Assoc. Prof. Dr. Khalid Mohd. Nor, Deputy Vice-Chancellor for Development representing the Vice-Chancellor of Universiti Pertanian Malaysia.

Assoc. Prof. Mohd. Shah Hj Lassim congratulated the participants for their fruitful deliberations on the 6-modules regarding the pre-service and in-service training of primary and secondary teachers and supervisors in environmental education. He was happy that the Faculty of Educational Studies, UPM, had decided to undertake the task of producing and improving the much-needed materials for teacher training in environmental education. The workshops had given all those involved invaluable experience in materials production and organising a regional seminar (see Appendix 9).

Dr. Abdul Ghafoor Ghaznawi spoke on behalf of UNESCO and said that the seminar has succeeded in achieving its immediate objectives:

1. to familiarize participants with the contents of the series of teacher training modules in environmental education prepared by UNESCO;
2. to develop prototype environmental education units for incorporation into teacher training courses;
3. to identify methods and institutions for local adaptation of the modules;
4. to identify activities and documents in environmental education to be developed by IEEP-UNESCO; and
5. to enhance exchange of information and experience in this field.

Dr. Ghaznawi added that thinking has been spurred on teacher training in environmental education and UNESCO hopes that their immediate achievements could lead to concrete actions in teacher education renewals at national levels in the participating Member States

Dr. A. Ghafoor Ghaznawi thanked Prof. Dato Nayan Ariffin, Vice-Chancellor, Universiti Pertanian Malaysia, for accepting and organising the seminar on the beautiful and green campus of Universiti Pertanian Malaysia, and for making available the sources of the academic staff and support personnel, as well as the facilities of Universiti Pertanian Malaysia in the preparation and organisation of the seminar which has come to a successful conclusion. He likewise expressed his gratitude to Assoc. Prof. Mohd Shah and his staff members from the Faculty of Educational Studies, the Central Committee, the Organising and Working Committee, the support personnel, and the Director of the Centre for Extension and Continuing Education, for the excellent service rendered in the conduct of the seminar. He expressed thanks to the participants and observers for their constructive contributions and inputs to the seminar. (for full text, see Appendix 10)

Professor Dato' Dr. Nayan Ariffin, the Honourable Vice-Chancellor of Universiti Pertanian Malaysia, in his closing speech, hoped that the seminar has given all participants opportunity to exchange valuable ideas and views for the implementation of environmental education. He said that the time has come for educationists in Asia to play an important role in the conservation of the environment by inculcating positive values and attitudes among school children.

The instilling of these values should be the responsibility of teachers from all the disciplines. Environmental education may not be taught as a specific subject, but instead it could be integrated in other academic or co-curricular activities. Thus, the long-term objectives may be achieved. A concerted effort from world bodies, governments or various participating countries, concerned institutions and the public is called for in the successful implementation of environmental education in school (for full text, see Appendix II).

Acknowledgment

The following was submitted at the closing session by Dr. Costes (Philippines) on behalf of participants of the seminar.

The seminar workshop has reached the end of its course. It is almost with regret that we say this for, as you must have felt, the seminar workshop has generated fellowship among participants and reaffirmed harmonious educational exchange among participating nations through their representatives. But best of all we, the participants, have gladly accepted the task and the responsibility of spreading the message of environmental conservation and enhancement within our respective states to assure the present and future generations of a safe and beautiful earth to live in. All these would not have been possible without the support and assistance of many.

We, therefore, extend our sincere thanks and gratitude to the UNESCO for providing assistance, both administrative and financial, without which this seminar workshop would not have been realized; to the Universiti Pertanian Malaysia for organising the workshop and for its warm hospitality in providing facilities and venue for the seminar.

None more deserve our appreciation and deep gratitude than the indefatigable Dr. Abdul Ghafoor Ghaznawi who with his gentle ways and fine example has led all those involved into giving their best to the seminar.

We also wish to express our sincere thanks to the Deputy Minister of Education, Dr. Leo Michael Toyad, for lending his presence to declare the workshop open and for his inspiring talk; to Prof. Mohd. Shah Hj. Lassim, Dean of the Faculty of Educational Studies, Universiti Pertanian Malaysia for his chairmanship of the Central Committee; to Prof. Dato' Nayan Ariffin, Vice-Chancellor, Universiti Pertanian Malaysia, for gracing the opening session and rendering a most supportive speech; to Dr. Kamariah Hj. Abu Bakar for her over-all organisational work; to all resource persons and observers who shared with us their years of experience in education through the discussions; and to all members of the Central Committee, Organising Committee, and Secretariat for their behind-the-scenes efforts to get all planned events done on schedule.

We extend heartfelt appreciation to YAB Menteri Besar, Negeri Sembilan; to YAB Ketua Menteri Melaka, and to Pengetua Sekolah Menengah Muzaffar Shah, Air Keroh, Melaka for the fine repast and dinners in our visits to their respective places.

To the presentors of the environmental education teacher training modules for their preparation and presentation; to all who attended the workshop and shared their experiences in the discussions and outputs; and finally to all the support staff who have helped bring this seminar workshop to a successful fruition, we say from deep in our hearts a sincere thank you.

We look forward to continuing joint efforts with UPM and UNESCO.

III. PRESENTATION ON THE UNESCO-UNEP INTERNATIONAL ENVIRONMENTAL EDUCATION PROGRAMME (IEEP)*

Background

UNESCO and UNEP launched IEEP in 1975. This initiative was based on recommendation 96 of the UN Conference on Human Environment, Sweden, 1972.

Objectives

The objective of the IEEP is to develop formal and nonformal environmental education in order to:

1. make people aware of the nature of the relationship between man and the environment on which he depends;
2. impart knowledge and skills to understand and solve environment and development related problems; and
3. enable people to acquire attitudes and motivations leading to sound decisions and actions for the protection and improvement of the environment and its quality.

Emphases of IEEP Activities

1. The incorporation of environmental education into teaching/learning processes at primary and secondary schools, pre-service and in-service teacher education, university general education, technical and vocational education, and nonformal education.
2. Local adaptation and use of environmental education materials and documents developed under IEEP.
3. Fostering international cooperation in this field.

Activities

1. *The Belgrade International Workshop on Environmental Education.* The Belgrade International Workshop was organised in 1975 which led to the preparation and announcement of the Belgrade Charter on Environmental Education.
2. *First Intergovernmental Conference on Environmental Education.* It was in 1977 that the first Intergovernmental Conference on Environmental Education was organised by UNESCO in cooperation with UNEP in Tbilisi, USSR. This Conference produced a concrete outcome in the form of a Declaration and 41 Recommendations reflecting environmental education goals, objectives, guiding principles and strategies for environmental education development within different types and levels of education. This was considered a landmark in the historical development of environmental education in the 1970s. It has served as a common ground for almost all international undertakings and most national activities in environmental education.

*

By Dr. Abdul Ghafoor Ghaznawi.

3. *International Congress on Environmental Education and Training.* The International Congress on Environmental Education and Training was organised by UNESCO and UNEP from 17-21 August 1987 in Moscow, USSR. The programme of the Congress included a review of progress and trends in environmental education since the Tbilisi conference; the state of the environment and its educational and training implications; relations between intergovernmental environmental-scientific programmes and environmental education and training; presentation of a draft international strategy for environmental education and training through the 1990s.

Five symposiums were considered, namely:

- a. the role of environmental education in international understanding and environmental problems;
 - b. the contribution of environmental education and training of sustainable socio-economic development;
 - c. the role of the media and new communication systems in the promotion of environmental education and information;
 - d. the role of biosphere reserves and other protected areas in the dissemination of ecological knowledge and the training of ecological specialists; and
 - e. national experiences and the contribution of non-governmental organisations in the development of environmental education and training progress and trends; thereby giving participants an opportunity to share experiences in national development and achievements in environmental education at all levels.
4. *Exchange of Information.* The main activities of IEEP in this area can be summarized as:
- a. publication of *Connect* in 5 languages and distribution to 13,000 professionals and institutions;
 - b. compilation and issuance of a Glossary of EE Terms; and
 - c. updated bibliography on environmental education as well as directories on institutions, projects and activities in EE. Numerous meetings have also fostered this aspect of IEEP's activities.
5. *Research and Experimentation.* IEEP's research and experimentation activities have involved an international survey of EE needs and priorities; surveys on curriculum development and teacher training in EE, survey and studies on the incorporation of EE into university general education; studies on the development of guidelines for the incorporation of EE into non-formal education and into technical and vocational education. Similarly, IEEP has supported 31 pilot, experimental and research projects in formal and non-formal environmental education. Furthermore, IEEP has supported the local adaptation of selected EE documents at the national level.
6. *Materials Preparation.* IEEP has produced and distributed around 77 documents. This number is increasing. Examples are sourcebooks, modules, and guidelines for developing curricula and teacher training in formal as well as non-formal EE. The Environmental Education Series contains 25 documents.

7. *Training of Key Personnel.* IEEP's training activities in EE at international, regional, subregional and national levels have focused on key personnel such as curriculum developers, teacher educators, educational planners, educational administrators, and supervisors, as well as personnel in rural development and adult education projects for the purpose of their orientation for a better understanding of the philosophy, goals and objectives of EE. The training is also intended to familiarize key personnel with strategies needed for EE development for primary and secondary schools, for pre-service and in-service teacher training and for its incorporation into non-formal education. It is in this context that one international training course, 5 regional, and 9 subregional training seminars, as well as 45 national training workshops in the Arab States, Asia, Africa, Latin America and the Caribbean and Europe have been organised by IEEP.
8. *International Cooperation.* Most of the activities implemented by IEEP have an international cooperation dimension. Specifically, international cooperation has been enhanced through fielding advisory missions concerning EE training activities, curriculum development, and pilot projects. Similarly, nine EE regional and international meetings and conferences organised by governmental and non-governmental organisations have been supported by IEEP.
9. *Support and Collaboration with Member States in the Subregion of Asia.*

Malaysia — IEEP provided support to and collaborated in the preparation and organisation of a Regional Conference on Environmental Education in ASEAN universities and its transfer, 1981, the Subregional Training Workshop on Non-formal Environmental Education, 1985, and the current seminar.

Sri Lanka — IEEP has provided technical and financial support for the preparation and organisation of a national training workshop, the implementation of an operational project on environmental awareness and management, and the preparation for UNESCO-Central Environmental Authority Seminar on Environmental Education in Sri Lanka to be organised in February 1988.

Philippines — IEEP has rendered support to a national training workshop and preparation of a teacher training module in Environmental Education.

Thailand — IEEP has supported a national training workshop and preparation of teaching materials in Environmental Education.

Indonesia — IEEP has supported a pilot project on the development of Environmental Education at primary school level in the city of Jakarta.

Bangladesh — IEEP supported the organisation of a national training workshop in Environmental Education.

India — IEEP's support in India has been in the implementation of two pilot projects, preparation of two teacher training modules, preparation and organisation of a Consultation Meeting on the Incorporation of Environmental Education with the Training of Curriculum Developers, Teacher Educators and Education Planners, the preparation and organisation of a Subregional Workshop on Teacher Training in Environmental Education, a Subregional Training Seminar on the Incorporation of Environmental Education into the Curriculum and Teacher Training for Industrial Schools.

IV. PRESENTATION AND DISCUSSION OF COUNTRY REPORTS

Major Environmental Problems That Were Identified

Pollution of the air, land and water, was the most common problem highlighted by the participants from the Indonesia, Malaysia, Philippines, Sri Lanka and Thailand. This was followed by the problem of the depletion of natural resources in all these countries. Another common problem was that of solid waste disposal. Coastal erosion and degradation are environmental problems in the Philippines and Sri Lanka. However, it is only in the Philippines where natural calamities such as typhoons, earthquakes, and volcanic eruptions are major problems. Indonesia reported rapid population growth problems and problems of technology.

Measures Taken for Solving Problems

Legislation was one of the means by which all the nations attempted to prevent and to solve environmental problems. In Sri Lanka, for example, large numbers of birds, reptiles, animals and plants are protected under the Fauna and Flora Act. The Philippines has also passed laws with regards to the use of explosives and chemicals in fishing, and pollution by industry. In Malaysia laws regulating production of crude palm oil and raw natural rubber, and sewage and industrial effluents have been passed.

Various agencies have been established by these countries to coordinate and facilitate activities related to the conservation of the environment. For example in Sri Lanka, agencies like the Central Environment Authority, Sri Lanka Standards Institute and the Urban Development Authority have been established. In the Philippines, the National Environmental Protection Council and the National Pollution Control Commission are such agencies.

Education is also viewed as one of the measures for solving and preventing environmental problems. All the participating countries have made attempts to introduce environmental consciousness through formal and non-formal education. Malaysia reported of a major curriculum change at elementary school level, while in the Philippines a master plan for environmental education is under preparation. Recreational facilities, parks, sanctuaries, marine parks, urban forestry and reserves have been established. This has been the case in Indonesia, Malaysia, Philippines and Sri Lanka.

In relation to forestry and soil erosion, these nations have launched reforestation programs. There have also been attempts to bring about proper disposal of solid wastes.

Current Formal and Non-formal Environmental Education Programmes

Formal Environmental Education Programmes

All the countries reported to have integrated environmental education topics in various subjects and instituted environmental courses in their curriculum. In the Philippines, it is integrated in the science and social science subjects. In Sri Lanka, at the primary school level, environmental education is taught as an individual subject entitled social studies. In Malaysia a major curriculum reform at elementary school was reported where a new subject entitled "Man and the Environment" has been introduced from grade 4 to 6 to replace the classical subjects of science, health, history, geography, and civics. However, at the secondary school level it is integrated into almost all subjects. In Indonesia, it is integrated in all levels of formal education with greater integration in science, social science, and population education.

The main objective reported in the integration of the environmental education component in the curriculum is to inculcate positive values and attitudes toward environmental conservation in the students from a very young age as well as to develop knowledge and understanding of the environment.

The approaches to environmental instruction at the pre-school and primary school levels in Sri Lanka, Indonesia, and Malaysia give the child first-hand experience with the environment. In Sri Lanka, at the secondary school level, environmental concepts are developed through students' personal investigation and analysis of second hand data. In the Philippines, the strategy is to demonstrate and illustrate the importance and relevance of the scientific approach to the environment and its conservation.

The most serious problem encountered in the implementation of formal environmental education was that teachers are not adequately qualified or professionally trained to teach environmental education. Urban schools lack suitable natural environments. The problem of lack of resources and overcrowded classes were also reported.

Non-formal Environmental Education Programme

In all countries, nongovernmental organisations are involved in non-formal education programmes. However, in Malaysia, many government departments are involved in non-formal education programmes. The main objectives reported are to inform the general public of the importance of environmental management and the need for the prevention and solution of environmental problems as well as to create public awareness of environmental conservation.

Various approaches to implementation were also reported. In the Philippines, newsletters, brochures, brief reports, surveys and investigations of environmental conditions are produced or conducted. Workshops, conferences and seminars of the same nature pertaining to certain environmental concerns are also held from time to time. Sri Lanka has various important environmental education programmes in operation such as those conducted by the Field Studies Centres programme, the Science Education Support Centres programme, the Committee for the Popularization of Science, the Non-Formal Environmental Education Programme conducted by the Central Environmental Authority, etc.

The government departments in Malaysia that are involved in non-formal education programmes include the Department of Environment, the Wildlife and National Parks Department, etc. These departments provide publications and educational materials and other informative talk sessions.

In Indonesia, the non-formal environmental education programme is usually carried out by nongovernmental organisations although governmental institutions sometimes do get involved.

Problems encountered in the implementation of non-formal environmental education were reported to be of similar nature in all participating countries. These include: shortage of financial resources and trained personnel, lack of expertise to formulate comprehensive environmental education action plans at the local level that cater for various target groups, and shortages of facilities in schools. Malaysia specifically mentioned that environmental education programmes have yet to attain a high priority amidst competing priorities of economic and industrial development.

Pre-service and In-service Teacher Education in Environmental Education

Pre-service Teacher Education

Pre-service teacher training programmes in Malaysia, Philippines, Sri Lanka, Thailand, and Indonesia include an environmental education component at both the university and college levels.

In the Philippines, the pre-service teacher training course is a 2-year certificate programme (Certificate in Elementary Education), preparing students for teaching in the elementary

school, with environmental dimensions incorporated in the science subjects, or a diploma programme (Bachelor of Science in Education), preparing students for primary/secondary school teaching giving particular attention to the environmental dimension.

In Malaysia, courses specifically on environmental concerns offered at the university level are elective courses in Environmental Education (Level 1: Post Graduate Diploma of Education at Universiti Malaya) with emphasis on environmental awareness; and Environmental Health (a 2-credit hour course at Universiti Pertanian Malaysia) aiming at understanding the relationship of man and his physical and non-physical environments. At the college level, environmental dimensions are incorporated in subjects like Man and the Environment, Geography, Health and Moral Education, and co-curricular activities.

In Indonesia, pre-service teacher training is done through the Teacher Training School and Institute of Teacher Training and Education (ITTE). At the Teacher Training School level, Environmental Science and Issues are integrated into subjects like Science, Social Science, Pancasila Moral Education, Religious Education, and at the ITTE, environmentally related courses are offered, especially by the Biological Education Department.

In Sri Lanka, organisation of pre-service teacher training is based on two major criteria: the school level at which the teacher teaches, and the subject areas taught by the teacher. In the Colleges of Education, there are common compulsory programmes in the primary as well as the secondary teacher training curricula which include environmental components. The programmes are:

1. school and the community,
2. physiological foundations of education,
3. health and physical education.

Apart from these programmes the Science/Mathematics and primary curricula have their respective environmental components in their syllabuses.

In-service Teacher Education in Environmental Education

In-service teacher training programmes in environmental education are conducted by teacher training institutions and colleges, curriculum development centres and government agencies in Malaysia, Sri Lanka, and Philippines. In Indonesia, programmes as such are yet to be carried out since they are at the preparation and development stage in order to bring about an effective system. In Sri Lanka, in-service teacher training programmes are also conducted through the Distance Education Programme, a 3-year activity-based science syllabus study as an alternative way of giving professional training to untrained teachers. In the Philippines, the public and private schools conduct separate in-service training programmes but both include environmental conservation concepts. Generally, emphasis is on environmental awareness and implementation is through incorporation in the discipline of science, health education, and social studies.

Suggested Priorities for Pre-service and In-service Teacher Education in Environmental Education

The participants are generally agreed on the following:

1. Concerned curriculum developers should clearly identify the environmental problems and issues facing the country. For this purpose, expertise should be obtained from government and nongovernment institutions before curriculum content is finalized.

2. A training programme should be conducted for educational planners and curriculum developers in environmental education in order to make them fully aware of the environmental issues and problems in the various localities of the country.
3. The teacher educators have the responsibility of giving the pre- and in-service teachers a thorough training to develop competencies necessary to meet the demands of environmental education. This requires the revision and renewal of teacher training curricula.
4. Sourcebooks, teacher's guides, activity manuals, self-training modules, training manuals, and resource materials in environmental education may be developed for pre-service and in-service teachers for primary and secondary schools.
5. A networking of various groups interested in developing environmental awareness may be established.

Suggested Strategies for the Incorporation of Environmental Education into Primary and Secondary Teacher Education

Following are the strategies suggested:

1. The need to educate both formally and informally the nation on matters pertaining to the environment should be given a very high priority.
2. Teacher training is recognized to be a significant area for action in achieving the objectives of environmental education. Environmental education programmes should be extended to all teachers colleges and included in their curriculum.
3. All universities offering education courses should have environmental education as a required subject instead of an elective.
4. More resource materials on environmental education as referred to in the preceding section are to be developed to enhance teachers' information, knowledge, and skills with respect to teaching/learning in environmental education.
5. Extend the period of in-service course for key personnel from the usual 1 week to 2 weeks to include many aspects of environmental education.
6. School-based in-service training in environmental education should be encouraged so that training could become related to the realities of the immediate environment.
7. Environmental problems at the community surroundings of the school should be identified and environmental educational activities should be planned around them.

Discussion on Country Reports

It was expressed that while industry is always seen as a source of environmental pollution, yet the government encourages industrial development. It was suggested that industry must get involved in suitable programmes aimed at fostering environmental awareness of the general public. Integrated effort between industry and the public is necessary so that the public would further understand the role of industry and its effort in promoting environmental awareness. Examples of such close cooperation were found in the Philippines where IBM which produced and televised the film series, "Planet Earth" highlighting the relationship of man and his environment and Caltex which had sponsored national quiz shows on science and environmental studies.

Involvement of nonprofit/nongovernmental agencies in environmental education was also discussed and emphasised. It was revealed that membership into professional organisations have not been successful largely because of the fees imposed. The role of the NGOs in environmental education activities conducted by the governmental bodies was also discussed. It was clarified that in Malaysia members of NGOs are asked to sit in committees formed by the Department of Environment. The involvement of the NGOs, however, is mainly indirect in nature.

The testing and evaluation of the environmental dimension of teacher training programmes, of the teaching/learning elements of the curriculum, and of the processes involved were discussed. Evaluation and its support activities are considered essential undertakings for a sound development of environmental education.

V. PRESENTATION AND DISCUSSION OF WORKING DOCUMENTS

Seven documents on teacher training in environmental education were presented at the seminar. Summaries of these documents are attached to this report (for full text, see Appendix 12). Following are the highlights of the presentations and discussions on the working documents.

Strategies for the Training of Teachers in Environmental Education (EE Series 25)*

Under the chairmanship of Dr. Khalid Mohd Nor, Deputy Chancellor of Universiti Pertanian Malaysia, the document entitled "Strategies for the Training of Teachers in Environmental Education" was presented by Dr. Abdul Ghafoor Ghaznawi of UNESCO, Paris. The presentation and discussion highlights are given below.

With respect to the objectives of the above document, it was expressed that in view of the diversity of the levels and types of teacher training, the document's major achievement is the suggested processes for developing strategies and training programmes. The application of these processes with necessary modifications could be considered in the context of different teacher education systems. It was emphasised that the goal of all teacher training programmes in environmental education should be to develop the environmental education competencies needed to incorporate the environmental dimension into their teaching.

Current teacher education efforts and programmes in environmental education should be aimed at developing competencies needed for effective instruction in environmental education. Despite the recommendations of the Tbilisi Conference for environmental education to permeate all areas of the curriculum, this will not take place unless teachers develop the competencies to make it happen.

Successful pre-service and in-service teacher training activities were reported from the U.S.A., U.K., Colombia, Bulgaria, USSR, Thailand, Indonesia, and Malaysia. The methods reportedly employed for in-service training of teachers in environmental education were workshops, graduate and continuing education courses, staff meetings, conferences, staff exchanges, released time for staff improvement, correspondence courses, use of radio and television media, publications, and journals and newsletters.

The need for teacher training in environmental education was evident in the results of UNESCO Survey on Needs and Priorities and from the recommendations of the Tbilisi Conference on Environmental Education. For enhancing teacher training in environmental education, it is essential to convince through seminars, meetings, etc. educational policy members, educational planners, and faculty members from teacher education institutions of the need and urgency of training teachers in this domain. Without their support there is little that can be done.

Twenty-seven competencies were reported to be required of teachers for effective environmental instruction and should be adequately developed in professional programmes on environmental education. These competencies are categorized into ecological foundation, conceptual awareness, investigation and evaluation, and environmental action skills.

With respect to a process for curriculum development for teacher training programmes, the following suggestions were proposed:

1. give a specific course on environmental education methods,
2. infuse environmental education methods and foundational components into the existing teacher training programme, and

* For resume of EE-25, see Appendix 13.

3. add courses in curriculum which deal with foundational components.

An ideal programme would include all the above three suggestions.

Constraints in the incorporation of environmental education into teacher education are found in the traditional contents and methods utilized by teachers, even at tertiary level, who tend to teach what they had been taught in the manner in which it had been taught to them.

Similarly, lack of administrative interest, support or power, budgetary constraints, prescribed or dictated curricular thrust into the student teaching experience and lack of environmental commitment among the pre-service teacher population itself are among the limiting factors hindering the incorporation of environmental education into teacher education.

In the discussion which followed the presentation, the question of teaching environmental knowledge and values was raised. The introduction, development, and assessment of environmental values in the teaching/learning processes were considered difficult. But environmental knowledge was considered to be rather easy to infuse into various subjects, and its impact on the students, relatively immediate. It was hoped that such infusion would eventually lead to good habit and attitude formation among students. With this in mind it was suggested that environmental education should be taught to students as early as possible through practical and directly related real life experiences. An example given was to teach personal hygiene and public health. It was further felt that Curriculum Development Centres, in their capacity as central bodies in education, could help design an integrated curriculum wherein environmental education is infused in various subjects, including Math and History.

It was also suggested that due to its wide scope, environmental education could be treated as a separate subject with integrated units.

Another strategy was the infusion through arts and music appreciation. Songs with catchy tunes could be composed and broadcast. This technique has worked well in the Philippines. Nature is one of the recurrent themes in Persian poetry. This type of literature could be used as an enrichment activity in environmental education. Poems can be turned into lyrics of songs about nature.

A teacher is a model figure in any teaching situation. In environmental education it is even more important that he/she reflects positive, ethical values toward the environment. The teacher cannot afford to be negligent because as a role model his/her behaviour should clearly signify which environmental values should be upheld and internalised.

An issue that was raised was the difficulty in assessing affective development. One suggested method was "profiling" students. Affective development is best evaluated through observing the students' behaviours and reactions inside and outside their classrooms. Other teaching staff members could also provide inputs toward the final assessment of the behavioural and action-oriented changes of the students.

A question was raised with regard to the effectiveness of these instructional and evaluation strategies in an exam-oriented school system. It was observed that students tend to be more motivated and more willing to learn if they know they would be tested or examined on the subject matter. Motivation is even greater if such information is required for an entrance exam to a university or for acceptance into a certain profession. Based on this assumption, it was further added that countries which choose to include environmental concepts in their examinations would probably give a more, immediate impetus to the development of environmental education.

Environmental Education: Module for Pre-service Training of Teachers and Supervisors for Primary School (EE Series 5)

Under the chairmanship of Mr. N.S.R. De Silva (Sri Lanka), the document entitled "Environmental Education: Module for Pre-service Training of Teachers" was presented by Mr. Mokhtar Hj. Nawawi of the Faculty of Educational Studies of Universiti Pertanian Malaysia. Highlights of the presentation and discussion are as follows:

The module focuses on the pre-service training of teachers and supervisors for the teaching of environmental education in the primary level. The content of this module is considered minimum knowledge for the student teacher who will be teaching environmental education.

The main objectives of the module are to:

1. foster the acquisition and the transfer of knowledge, skills, and affective attributes concerning the environment and its problems;
2. develop competence in the teaching and supervision of the environmental dimension in primary schools.

The history of environmental education was traced from the first call of alarm by ecologists in the developed nations concerning pollution that was made in the Stockholm Conference on the Human Environment in 1972, to the Belgrade Conference in 1975 which produced the framework and guiding principles for environmental education, and the regional meetings on environmental education in Africa, Asia, the Arab States, Latin America and Europe.

The underlying philosophy and goal of environmental education, according to the module, is the development of world citizens possessing the following characteristics: self-discipline, global outlook, wholeness of self (i.e., oneness and interdependence of man and the environment), ability to examine the political and economic measures that support cooperation rather than conflict, and the willingness and capability to plan and implement action to improve the environment.

To teach/supervise environmental education in the primary school effectively, the student teacher should have a thorough knowledge of the environment, its biophysical components, ecosystem dynamics, cycles of nutrients, homeostasis of biological system, ecological succession, population dynamics, and the flow of energy and nutrients through biological systems. The student teacher should also have a good understanding of the socio-cultural components of the environment and the interactions between the biophysical and the socio-cultural components.

The pre-service training should also require a good grasp of the diverse problems that arise from interactions in the environment. These problems could be naturally occurring such as earthquakes, volcanic eruptions, tropical cyclones, and tornadoes, or man-induced such as pollution and solid waste disposal. Problems brought about by an increasing population's demand for food the production of which requires intensification of agriculture through selective breeding, use of chemical fertilizers and pesticides, irrigation, and mechanization — all man-induced — have resulted in disease outbreaks, contamination of water supply, and soil degradation. Other man-induced problems are those related to water supply, extraction of minerals and energy resources, and the utilisation of materials and energy.

These environmental problems demand solutions, if man is to exist long on this earth. The solutions require basically a change of attitude by man.

A recommended model or approach to finding solutions to environmental problems consists of the following stages:

1. preliminary investigation and fact-finding
2. interpretation and planning
3. implementation
4. evaluation

Of much significance to the student teachers are the three strategies for including environmental education in the curriculum. These are:

1. infusion method — the incorporation or integration of environmental concepts into the existing curriculum;
2. applied learning method — applying the knowledge acquired from other disciplines to real life problems; and
3. holistic method — evaluating the "ecological health" of an environment by comparing it with a similar mature ecosystem.

Evaluation is a process of determining the degree of desired changes that had taken place. It is recommended that environmental education, like any other undertaking, must be subjected to both formal and informal evaluation.

Discussion After the Presentation

A question arose concerning the content portion of the document, the large number of technical terms, and terms which may be considered college level. The question is: How do you expect primary school children to learn all these terms?

It was explained that the module is a resource text for the teacher educator who will use it for teaching student teachers.

In light of this explanation the question was rephrased as follows: How then do you expect the student teacher to convert it to instruction appropriate to primary children when he/she becomes a teacher? The response was that the module is to serve as the future teacher's background information. There is, indeed, a need to simplify and adapt the module into teaching materials suitable for primary school children. The concept/content can be translated into activities that are within the life experiences of children.

A participant raised the issue of emphasis in the teaching of environmental education. Should it be on content or the translation of environmental education into a way of life? The reply took into consideration the fact that the receiver of pre-service training is the prospective primary teacher. When he/she begins teaching, a syllabus would be provided to serve as a guide. The content is only a means to enable a prospective teacher to teach environmental education as a way of life.

Environmental Education: Module for In-Service Training of Teachers and Supervisors for Primary Schools (EE Series 6)

Under the Chairmanship of Mr. N.S.R. De Silva (Sri Lanka), the document entitled Environmental Education: Module for In-Service Training of Teachers and Supervisors for Primary Schools was presented by Dr. Siti Hawa Ahmad, Curriculum Development Centre, Ministry of Education Malaysia. Highlights of the presentation and discussion are as follows:

The module focuses on the in-service training of teachers and supervisors in environmental education for primary schools. It aims at fostering the acquisition and transfer of knowledge, skills, and affective attributes concerning the environment and its problems, and to develop competence in the teaching and supervision of environmental education in primary schools. The emphasis is to increase awareness and sensitivity towards the environment and its problems.

Two alternative modes of implementation of the module are:

1. to make funds available to states for running in-service courses,
2. to infuse the content/approach/methodology of this module into the states' own programmes of in-service training for the primary level.

It was noted that human actions on the environment often result in the overall ecological/environmental crises. The need to realise our responsibility towards the environment therefore exists followed the presentation. Different orientations or approaches such as education *for, of, with, and about* the environment will definitely help individuals realise their responsibility, not only towards their fellow beings, but also towards the total environment. The primary school age is a very sensitive stage for learning and forming attitudes and realising responsibilities.

Primary school teachers also need background information on the history of environmental education, the evolution of the philosophy, goals, general objectives, and guiding principles of environmental education from a series of international conferences. Based on these, the schools are expected to design and develop environmental education programmes, both formal and non-formal. Criteria for the selection of teacher trainees are spelled out for possible adoption in teacher training programmes.

The recommended essential knowledge for teacher trainees in environmental education in-service training programmes may be divided into:

1. environment, its components, matter and energy in it, and interaction among components and processes;
2. pathways of matter, flow of energy consisting of the nutrient cycles, the transfer of energy and matter through various food chains and food webs, and the role of man in these changes;
3. ecological system and the impact of man.

It is not enough for the environmental education teacher to be knowledgeable about the environment. The teacher must also have a thorough knowledge of environmental problems brought about by man's activities and limitations of its resources. The in-service trainee is encouraged to consider alternative solutions to these problems, particularly those concerning resource depletion, population explosion, and transfer of technology.

Several teaching strategies are made available to the in-service trainee: inquiry, problem-solving, simulation and gaming, beyond the school experiences (field activity), and case study. Examples of environmental activities employing these strategies are contained in the module. The teacher trainee should be able to devise/design/write up activities similar to those presented in the module.

Evaluation in environmental education teaching is intended to:

1. evaluate a pupil's progress at different stages of learning,

2. diagnose a pupil's difficulties in learning,
3. serve as a mechanism for improving teaching.

Evaluation should match the unique characteristics of environmental education, namely interdisciplinarity, focus on problem-solving, on action-orientation, and values and attitudes.

Discussion After the Presentation

The first question was why the content of EE Series 6 (In-service Training of Teachers and Supervisors for Primary Schools) is very similar to EE Series 5 (Pre-service Training of Teachers and Supervisors for Primary Schools). The response was that, although the basic environmental concepts are the same, the technique of dealing with the target group was basically different. In the pre-service training the student teacher as an end product has to be motivated. In the in-service training, the teacher trainee, experienced as he/she is in teaching, still needs a whole range of knowledge on the topics in environmental education as well as a re-orientation to the known subject matter in order to redirect it towards conservation and enhancement of the environment.

It was also noted that the provision of a continuous reeducation (in-service courses) in terms of the same body of knowledge, for example, in environmental education, can become repetitious and, therefore, boring. The response was that the core content of the in-service training curriculum was specifically intended to increase knowledge in breadth and depth. It is essential for those responsible for the training to conduct an assessment of the knowledge possessed by the teacher trainees at the beginning of the training period. It is also true that what may be needed is not knowledge but strategies of presenting them, strategies of classroom management, and strategies of dealing with students on an interpersonal basis.

The Indonesian experience with the Open University System of making provisions for the re-training of teachers to further their knowledge was described. The same or similar system of re-training or in-service training may be applied to environmental education. The main problem encountered in this system was the training of teachers who already have had five years or more of teaching experience. It is difficult to break old habits or to give up old irrelevant knowledge in light of new curricula.

Sri Lanka also faced the same problem of re-training teachers. The Curriculum Development Centre has taken on the responsibility for the formulation and implementation of an in-service training programme.

Malaysia's categories of in-service training courses into introductory, refresher, and extension courses were mentioned. However, even environmental education had already been introduced as an elective course in a teacher training institute.

There was a question on differentiated treatment in the in-service training of those trained in different disciplines. Is this advisable? The answer was that it was imperative at the start to delineate certain key disciplines to allow the incorporation of environmental concepts in each one accordingly but emphasis is on problem-solving which for best results requires an interdisciplinary approach.

One participant suggested that the planning of the environmental education curriculum be made by a team of lecturers from different disciplines. Such an effort had been successfully made in an in-service course on communication skills. It can prove successful in environmental education as well. This suggestion was considered by other participants as difficult to implement.

Should there be priority in the use of EE Series 5 or EE Series 6? It was elaborated that each module has a different target group and different implementation requirements for serving objectives. Thus, priority should be based on the needs of particular situations with due consideration given to its adaptation for relevance.

Environmental Education: Module for Pre-service Training of Science Teachers and Supervisors for Secondary School (EE Series 7)

Under the Chairmanship of Mr. Nagendralingan Ratnavadivel, the document entitled Module for Pre-service Training of Science Teachers and Supervisors for Secondary Schools was presented at the seminar by Dr. Ahmad Badri Muhammad.

The session commenced with the showing of slides that contrasted beautiful and clean environment with dirty and poorly managed environment the purpose of which is to impress upon the audience the importance of establishing values in environmental education.

The resumé of Environmental Education Series 7: Module for Pre-service Training of Science Teachers and Supervisors for Secondary School was subsequently presented. Attention was called to the five objectives of the module which are:

1. to develop a sense of urgency concerning environmental crisis and the need for environmental education;
2. to trace the origins and define the characteristics of environmental education;
3. to establish the relationship between science teaching and environmental education;
4. to promote problem-solving as the central feature of environmental education;
5. to acquire skills in curriculum planning, teaching strategies, and methods of evaluation appropriate to environmental education.

In Chapter 1, the need for the pre-service science teachers to be informed about the nature of environmental issues, environmental challenge to education, the need to define environmental education, and the relationship of environmental education to science was elaborated on.

The pre-service teacher educators were asked to:

1. be aware of environmental situations that have educational potential;
2. identify educational issues;
3. be enthusiastic about environmental issues;
4. be assured of availability of resources in teaching;
5. familiarise students with the aims of environmental education;
6. be able to relate general aims to specific educational tasks;
7. reinforce the knowledge students have about science teaching;
8. be aware of different purposes for environmental education.

The relationship between environmental education, science education, technology, and society was brought to the fore. Science and environmental studies use the same basic skills: observing, classifying, formulating and suggesting hypotheses, and designing experiments.

A reiteration of the three important requirements of the pre-service training of science and environmental education teachers was made, namely: (1) commitment, (2) motivation, (3) method. These three requirements play important roles in teacher decisions on what environmental concepts should go into which part of science teaching. This is a curriculum task for the teacher that is of utmost importance.

Environmental problems of local, national, and global scope must be known to the pre-service teacher educator to convincingly lead the pre-service teachers to carry out investigations and propose solutions to real environmental problems. The case study technique is suggested for the accomplishment of this task.

Attention was called to the teaching strategies most suitable for infusing environmental concepts in science. Suggestions given in the module are games, simulations, field trips, and outdoor studies.

The pre-service teacher educator is faced with the question: How is environmental education to be evaluated? From the module the following reminder was obtained: assess the societal aspects of science and environmental learnings in addition to the cognitive content. Test instruments for this purpose may take the form of agree-disagree statements, fill-in the blanks, preference marking, hypothetical actions on a given problem, and learner reaction to slides depicting environmental issues.

For effective instruction the presenter suggested that the teacher must take cognizance of the personal nature of teaching, the background of the students, and engaged the students in activities that will stimulate their interest.

Four phases for the successful implementation of environmental education need to be stressed: recognition, identification, responsibility for overcoming constraints, and the maintenance of implementation activities.

Discussion After the Presentation

A comment came up concerning the time and safety constraints that prevent teachers from taking the class on excursions. Opinion was sought on the use of the school grounds for environment education activities. The general response of the group was to endorse the necessity for the pre-service teacher educator to conduct environmental activities in the school compound. However, the value of field trips to real environmental settings is immeasurable. Field trips can be planned for pre-service student teachers to nearby places of interest, even as a Saturday afternoon excursion.

A participant recommended highlighting the need for opening the heart and then the mind approach. The user of this approach, however, is faced with the difficulty of selecting the most suitable strategies for it. The motivation and commitment of the teacher himself should be the starting points. If the teacher has no interest in the activities, the students will suffer from low morale due to lack of teacher support. For the teacher to be stimulating, motivating, he/she must do extra reading and preparation.

It was noted that much importance was given to the development of teacher confidence in teacher training. Mastery of the subject matter is a way of building confidence. Confidence can also be acquired through religious awareness, civic consciousness, peer/professional group interaction, and social skills such as verbal and interpersonal skills.

Environmental Education: Module for In-service Training of Science Teachers and Supervisors for Secondary Schools (EE Series 8)

Under the Chairmanship of Mr. Nagendralingan Ratnavadivel (Malaysia), the document entitled Environmental Education: Module for In-service Training of Science Teachers and Supervisors for Secondary School was presented at the seminar by Miss Indra Somasundram of Seri Kota Teachers College. Highlights of the presentation and discussion are as follows:

The session commenced with the presenter expressing a preference for the term in-service education rather than in-service training as the emphasis in the former was on the cultivation of values while in the latter it was skills.

The module provides a comprehensive coverage of the various dimensions of environmental education for secondary school level science teachers and supervisors. The dimensions are:

1. objectives of the in-service education
2. the history and philosophy of environmental education
3. basic knowledge of environmental concepts and environmental concepts and environmental issues
4. teaching/learning strategies in environmental education
5. activities for the teaching/learning of environmental education
6. evaluation in environmental education
7. strategies for the implementation of environmental education

It was also mentioned that the module contains appendices to a number of aspects pertinent to environmental education. These include the following:

1. an environmental education syllabus
2. a summary of the Stockholm Conference on the Human Environment
3. declaration of the Tbilisi Intergovernmental International Environmental Education Programme

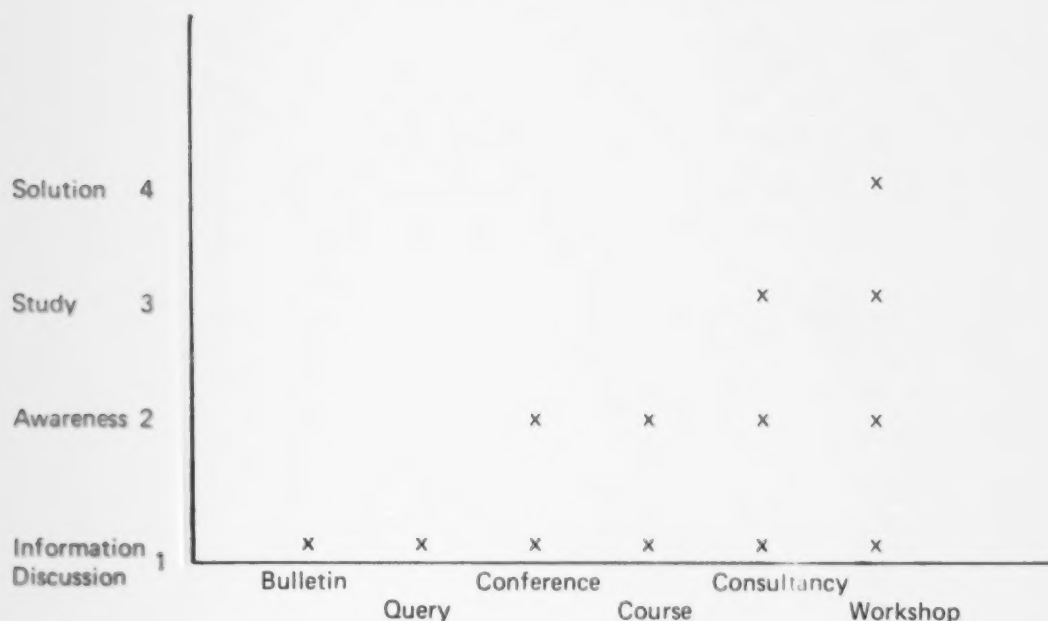
The module also focuses on the implementation requirements of the in-service programme, namely:

1. preparation of a course curriculum/syllabus
2. criteria for selection of the participants
3. preparation of schedule of activities
4. budget estimates
5. preparation of lesson plans
6. the formation of evaluation instruments

The key focus of the module as indicated in the general objective, is on competence. In the teaching/learning strategies in environmental education dimension, the key to this competence is the ability to be involved in active student participation. She also mentioned strategies like problem-solving, experimental investigation, survey method, case study, role play, and games and simulation.

The presenter then made a few points regarding the utilization of the module. The module is a teacher/teacher educator resource and not a syllabus. The module is to be used as a basis for developing teaching/learning units on local science-related environmental issues.

The presenter then gave the modes and levels of in-service education.



The presenter then went on to suggest what could be done during the workshop. These were the development of teaching/learning units through the following procedure:

1. Identify local environmental issues/problems that are science related
2. Locate the plug-in points in science curriculum
3. Provide conceptual maps of the relevant scientific and environmental concepts involved
4. Develop the teaching/learning strategies and activities appropriate for the teaching/learning of environmental problems

Discussion After the Presentation

A member commented on a statement made by the presenter that "values are caught rather than taught." He called attention to posters which highlight legislation concerning environmental conservation. He said that most people become aware of the environment only when they are fined, adding that maybe environmental legislation could be added to the content of in-service module.

The presenter agreed with the suggestion, and other participants were of the same view. Environmental legislation, according to one participant, can be seen in two levels: one, is the compliance of citizens to laws which are being enforced, two, is the lobbying or working for an environmental law that is not in existence but is much needed. But certainly this is a dimension of environmental education that should merit inclusion in the curriculum.

A question was asked: "Why are economic considerations in environmental problems not included as a topic in the EE module? One participant volunteered the information that the externalities and the damage to the environment by human actions intended for economic development can be considerable. Certainly the economics of the environment is important; it should be included in the module.

One participant noted the claim for interdisciplinary approach in this module which is science-based. He felt there is a conflict or inconsistency in it. The presenter explained that in science problem-solving can be approached, viewed, and solved by drawing from many disciplines, and, in this sense, it is interdisciplinary.

It was also suggested that to provide the science teacher trainee with a solid background in environmental education, an in-service training programme should include an extensive discussion of the history and philosophy of environmental education. The history of environmental education can be traced back to the Stockholm Conference in 1972 to the Belgrade Workshop in 1975 to the Tbilisi Conference in 1977. These are the international conferences which yielded such documents as the Declaration on the Human Environment, the Belgrade Charter, and the Declaration on Environmental Education, respectively. It is from these documents that the philosophy, goals and guiding principles of environmental education were drawn.

Several participants in the seminar agreed that a science teacher trainee must attain a mastery of the essential knowledge about the environment. This essential knowledge includes the ecosystem, the concept of limiting factors, energy flow in the earth ecosystem, materials flow which refers to the water cycle, the gas cycle, and the rock cycle. Population dynamics, the effects of human intervention in the natural processes, the human ecosystem, and the causes and consequences of major environmental problems would provide the essential knowledge required of a science teacher trainee who finishes the in-service training in environmental education.

Environmental Education: Module for Pre-service Training of Social Science Teachers and Supervisors for Secondary Schools (EE Series 9)

Under the Chairmanship of Mr. N.S.R. De Silva (Sri Lanka) this module was presented by Assoc. Prof. Lily Chew of the Education Faculty, University of Malaya, Malaysia.

The ten objectives listed in the module were condensed as follows:

1. To acquaint pre-service teachers and supervisors in social science with some essential knowledge about the environment and problem-solving approaches in environmental education;
2. To familiarise them with the planning, conduct, and evaluation of the environmental dimension of secondary school social science subjects.

The various sections of the module were further highlighted. They are:

1. the rationale for incorporating environmental education for pre-service training of secondary school social science teachers and supervisors which includes the sub-topics on history and philosophy of environmental education, goals for environmental education, environmental education in the secondary school and the need for pre-service training of secondary school social science teachers and supervisors in environmental education;

2. essential knowledge about the environment for secondary school social science teachers and supervisors;
3. issues related to the problems of the environment and ways and means to overcome them;
4. recommended teaching methodologies;
5. activities and experiments for teaching/learning the environmental dimensions in social science subjects in secondary schools;
6. methods of evaluation in environmental education;
7. some strategies for planning, development, implementation, management and evaluation of the environmental dimensions of secondary school social studies curriculum.

A distinction between the term 'social science' and the term 'social studies' was made as this would influence the designing of the curriculum content.

In *The Structure of the Social Studies* (1964), Scriven defines social studies as a selection from the social sciences, together with a good deal of data from everyday experience. Social science as a study with concepts drawn from history, geography, psychology, economics (including business principles), anthropology, government or political science (including civics), problems of democracy, ethics, logic, social studies (studies of man's social behaviour). To the above list, the presenter also added art, music, moral education and religion.

Thus a social studies curriculum can incorporate:

1. an available body of knowledge;
2. relevant knowledge to meet the needs of society and the individual;
3. knowledge in a form suitable for pupils to understand.

The presentation ended with a note that pre-service social science teachers lack resources and knowledge in problem-solving approaches in discussing environmental issues.

Discussion After the Presentation

A question raised was whether religious education, particularly the teaching of Islam could play a part in developing environmental values. It was the opinion of several participants that religion plays a very important part in inculcating values. It was pointed out that in Malaysia, courses in Islamic education at the tertiary level are offered at the International Islamic University and in the Academy of Islamic Studies in University of Malaya. The UNESCO representative added that the Institute of Environmental Science and Research in Egypt had developed a programme for "imams" wherein materials that were prepared for teaching related religion with environmental awareness. These materials had great potentiality, and follow-up studies were planned. In fact, values and beliefs common to all religions could be exploited in enhancing EE programmes. The teaching of values and beliefs should not merely be content-based but also problem-solving skills-based. In using the problem-solving approach on environmental issues, content could be the basis for resolving them.

Another issue raised was that on the differing concepts found in social studies and environmental education. The question was whether concepts in social science should take precedence over concepts in environmental education or vice versa. It was the view of the pre-

senior that many concepts in social studies incorporate a strong science base and that concepts of environmental education can be infused into disciplines like history and geography, the latter deals with such topics as land use, deforestation, etc. There would be no difficulty in infusing concepts in environmental science into social science. Some social science subjects are more conducive than others to the infusion of environmental education. More awareness of the environment could be infused through vicarious experience using description and reports.

The next question touched on the possibility of overloading the social science curriculum in view of the infusion of environmental education. The response was that it was mainly the approach that was important and emphasis should not be given on content per se. It was further added that overloading of content did not arise in the Malaysian situation where student teachers go through a basic science education in school. The infusion of EE concepts into the subject moral education is evident in the layman's knowledge. Further clarification was sought on the term 'layman's knowledge.' The term usually means the use of general terms that are readily identifiable by students.

It was brought out in the discussion that a study on the use of geographical skills involving recording, observing, and integrating data in Malaysian schools revealed that teachers had problems in generalization. It was felt that the problem was due to the lack of science-based explanation and is indicative of the compartmentalization of the disciplines. Another example of this inability to relate environmental awareness to social issues was the case of a beautiful school compound and the presence of a strong stench from a nearby monsoon drain.

Another question that came up was how to impart environmental education to manual workers like gardeners. In reply it was reiterated that essential scientific knowledge is found in the content of social science or social studies subjects. It was felt that science and non-science approaches need not be isolated in tackling environmental issues. In fact, regardless of whether the teacher is trained in science or social science, the teacher finally has to be a person who cares enough about the environment. The environmental education of the gardener can be provided through non-formal means like exposure to environmental conservation. Efforts by the headmaster and teachers to improve manual workers' environmental awareness could be looked into. The main point is to instill moral obligation rather than focus on content.

Environmental Education: Module for In-Service Training of Social Science Teachers and Supervisors for Secondary Schools (EE Series 10)

Under the Chairmanship of Mr. N.S.R. De Silva (Sri Lanka), the document entitled Environmental Education: Module for In-Service Training of Social Science Teachers and Supervisors for Secondary Schools was presented by Assoc. Prof. Dr. Thilla Chelliah, University of Malaya. Highlights of the presentation and discussion are as follows:

As an introduction it was pointed out that Social Science teachers already use materials related to environment and hence this could provide possibilities for infusion of the environmental dimension not as mass content but as a new perception of relationships and acquisition of new values within the social science context.

The in-service training for social science teachers and supervisors should aim at (1) developing responsible behavior towards the environment, and (2) helping young people to acquire suitable attitudes and values which make citizens more self-disciplined, self-reliant and who will understand their place in nature.

The skills necessary for social science teachers are (1) the methods of problem-solving, (2) values clarification, and (3) selection and use of relevant material.

The objective of EE Module Series 10 is to develop competence in teaching and supervision of the environmental dimension of social science in the secondary school.

The contents of the module include:

1. What environmental education is about
2. Essential knowledge about the environment for secondary school social science teachers and supervisors

This chapter explains the concept of the "environment" and then treats at basic level the influence of mankind in the four spheres that comprise the environment ie. the Atmosphere, the Hydrosphere, the Lithosphere and the Biosphere.

3. Essential knowledge for secondary school social science teachers and supervisors about the problems of environment and means and ways for their solution and prevention
4. Teaching methodologies in environmental education with special emphasis on problem-solving approaches
5. Evaluation in environmental education
6. Suggested experiments and activities to facilitate the teaching and learning of environmental education dimension of secondary school social science subjects
7. Strategies for planning, development, implementation, management, and evaluation of the environmental dimension of secondary school social science curriculum

It was suggested that infusion be used as a new perspective in methodology as well as in content. The major concept is that the environment consists of the biophysical and socio-cultural aspects which are interrelated and interdependent parts of a complex web. To fully absorb this concept, it is also necessary for teacher trainees to understand the four spheres – atmosphere, hydrosphere, lithosphere and biosphere – in order to upgrade their information and knowledge base in environmental education.

In the discussion that followed the presentation, it was stressed that in teaching and learning of environmental education it is the attitudes and values that are more important than content. To further emphasise the importance of values, the presenter narrated her experience in teaching environmental education as an optional subject to some Islamic students who approached the subject with diffidence. Knowing the need for water for cleansing purposes before prayers, she took that as her entry point. What is clean water? What is polluted water? What are the agents that pollute water and so on. Very soon the students were dealing with activities aimed at value clarification.

This demonstrates the relationships between a religious requirement (ablution) and the environment. It was pointed out that it is necessary to design methodology which would emphasise activities rather than content. In other words the emphasis is on action learning or learning by doing rather than through books. However it was said that the teacher should highlight important information. Such method would rely less on technical jargon. This is on the assumption that students are already equipped with information about the environment through media coverage. With this form of general knowledge, students can launch into activities.

It was also pointed out that since environmental education needed time for out-of-classroom activities as well, the time constraint creates problems in teaching. This led to the question: What is minimum environmental education content for teaching in an in-service training programme? The answer was that the subject matter of environmental education depends on the environment knowledge, information exposure of the teacher trainees and the conditions of the locality and country concerned.

It was explained that teacher trainees may have different levels of understanding the environment. However, there has been enough media coverage on environmental issues, (e.g. pollution through acid rain in Kelang valley, Malaysia). An in-service training programme should aim to provide all teacher trainees with a basic understanding of the environment.

It was further added that one way of making teacher trainees aware of what they know is through questions on how to include environmental education into the curriculum and what they would consider a suitable subject for infusion of environmental education. The trainee's responses are then analyzed. Based on this information, their understandings are discussed. This form of general knowledge is the take off point to deeper understanding of the environment. For example, the topic clean water can be developed further to include the effects of dams in an ecosystem.

It was also suggested that environmental education could be infused even in laboratory situations. When trainees handle apparatus, the teacher educators could seize these opportunities to explain why such materials could be environmental hazards. For example, when discussing electricity and dynamo, the trainors could lead discussions on building hydroelectric dams. When using acids the trainors could talk about safe disposal of such toxic materials. Laboratory safety has been incorporated into a course at the Teacher Training level in the Universiti Malaya. This unit entails discussions on safety measures and proper handling of toxic and lethal materials. During teaching practice, the trainees may be asked to include activities that would lead the class to discuss why such information is important to their lives.

Certain concepts of environmental education are already included in the curriculum of social science. Rather than infusion of environmental education concepts into the curriculum alone, it was suggested that a far better idea was to infuse also through methodology. This would make implementation easier as well as solve manpower financial problems in implementation. The teacher trainee takes the responsibility to learn the relevant environmental concepts while doing the activity.

VI. PROTOTYPE ENVIRONMENTAL EDUCATION UNITS DEVELOPED BY THE SEMINAR FOR INCORPORATION INTO THE TEACHER TRAINING PROGRAMME

The seminar participants were divided into two working groups after presentation of working documents. Each working group was given the task to select one or more essential environmental education competencies to be developed or sharpened on the part of teacher (primary, secondary science, and secondary social science) and to develop needed content elements, strategies and teaching methods, activities, and evaluation techniques needed for the inculcation of these competencies. The two working groups produced six prototype environmental education units which may be considered for adaptation and infusion into pre-service or in-service teacher training courses. A series of such prototype units may be developed for infusion into teacher education courses for developing a series of required environmental education competencies on the part of teachers.

The following are the six prototype units developed in the seminar:

Unit 1

The chairman of Group I, Dr. Ahmad Badri Mohamad, led the discussion on how to proceed with the workshop and what work to engage in. The following were considered:

1. that an examination and comparison of the content of EE Series 5 and EE Series 6 be conducted to determine their similarities and differences.
2. that a prototype unit for teaching at the pre-service level be developed.
3. that a consideration of the possibility of revising the philosophy and some of the essential content and objectives be made, particularly the objective to develop a "World Citizenry."
4. that a match be made between the Malaysia curriculum KBSR and the essential knowledge as given in EE Series 5 to assess the relevance and usefulness of the pre-service EE curriculum.

The group decided to adopt suggestion number 2 in the above list, that of preparing a prototype teaching material for the pre-service level to demonstrate how the content of EE Series 5 can be translated into a form directly usable by teacher educators in teaching environmental concepts to student teachers.

One of the competencies listed in the UNESCO document titled "Strategies for the Training of Teachers in Environmental Education," EE Series 25 was adopted as a starting point.

The following comprise the vital information for developing the teaching unit:

1. Competency to develop in the teaching material: to apply a knowledge of ecological foundations to the analysis of environmental issues and identify key ecological principles involved.
2. Approach adopted: infusion of EE into existing programme courses.
3. Course into which EE is to be infused: Biology.
4. Entry point of EE into the Biology course: the topic Ecosystems.

A delineation of the content, teaching strategies, values and attitudes, and evaluation that may be involved in developing the prototype teaching material was presented in a table format as shown in Table 1.

Table 1 facilitated the development of the prototype teaching unit or material which is presented after the table.

It will be realised from the scope of the prototype teaching material that several other lessons on life processes, natural cycles, energy flow, interaction between biotic and abiotic components, resources, human activities, and consequences of human activities as indicated in Table 1 need to be developed and subsequently taught to enable the student teachers to acquire the competency "apply a knowledge of ecological foundations to the analysis of environmental issues and identify key ecological principles involved."

Table 1

Guidelines for Incorporating Ecological Foundations in Pre-service EE
Teacher Training Programme for Primary School

Content	Teaching Strategies	Values	Evaluation	Resources
1. <i>Components of an ecosystem</i> a. biotic b. abiotic	1. Field trips* 2. Experiments* 3. Project work	1. Appreciation of the environment 2. Self-discipline	1. Written and oral exam 2. Performance test	1. Transport 2. Laboratory 3. Equipments for in Situ or field measurements
2. <i>Processes</i> Life processes Photosynthesis Transpiration Evaporation	4. Problem solving* 5. Case studies 6. Role-playing and simulation	3. Willingness to find out things for themselves 4. Willingness to take care of the environment	3. Solving and situational problems 4. Written assignments	4. References 5. Audio visual aids
3. <i>Natural cycles</i> Carbon Oxygen Water Rock Sulphur Energy flow Food chain & web Flow of thermodynamics	7. debates* 8. Discussion* 9. Situational* analysis 10. Establishing criteria 11. Forming judgements	5. Resource efficiency — good management 6. Opinionnaires	5. Performance/behaviour in daily life.	6. Resource persons 7. Worksheet 8. Specimen
4. Interaction between biotic and abiotic				
5. Resources: renewable & non-renewable				
6. Human activities agriculture mining				
7. Consequence of human activities				

The other lessons in ecology can be so planned as to include activities and student teachers tasks that lend themselves to the development of other competencies required of an EE teacher. For instance, content analysis of the prototype material will show that it also supports the development of competencies of 1, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13 and 14 listed in EE Series 25.

Prototype Teaching Material

Lesson on Components of an Ecosystem (3-4 sessions, 1 hour/session).

Objectives: At the end of this lesson the teacher trainees should be able to:

1. appreciate the variety and diversity of the components in an ecosystem.
2. develop self-discipline in following through a planned investigation of an ecosystem.
3. foster willingness to undertake a field study or outdoor investigation of a natural pond ecosystem.
4. explain the difference between biotic and abiotic components of the ecosystem.
5. suggest possible ways of identifying the biotic and abiotic components in a specific ecosystem (the pond).
6. acquire some skills in designing simple experiments that will reveal the reactions of organisms to changes in the abiotic factors in the environment.
7. acquire some experience in thinking out and suggesting solutions to environmental problems.
8. develop some skills in asking good questions (ie. questions that lead to discussion).

Subject Matter: Biotic and Abiotic Components of an Ecosystem

Procedure or Strategy of teaching

1. Motivate the class toward a study of a type of environment on actual site by discussing possible advantages and disadvantages to learning from such an activity. Seek a majority agreement on going to a nearby pond.
2. Bring the teacher trainees to a nearby pond.
3. Provide them with a worksheet to fill up while on site. The worksheet may require answers to the following:
 - a. Describe the surroundings of the pond, using all your senses whenever possible or when not dangerous.
 - b. Describe the appearance of the pond itself, the water it contains, and the organisms in it, if any.
 - c. Identify easily recognizable organisms in the pond.
 - d. Make inferences on possible human actions or absence of human actions that had brought about the present condition of the pond and its surroundings.

4. Collect samples of easy to handle organisms and samples of water from the pond.
5. In the laboratory in school, study the collected samples by using a hand lens and/or a microscope, if necessary.
6. Identify easily recognizable organisms in the samples. Seek help from the teacher educator or supervisor or consult reference books to identify other organisms.
7. Bring about a discussion of the following through skillful questioning:
 - a. How do microscopic and macroscopic plants in the pond obtain food?
 - b. How do microscopic and macroscopic animals in the pond obtain food?
 - c. What is the relationship between plants and animals in the pond?
 - d. What do you suppose will happen if all plants are removed from the pond? Why?
 - e. What do you suppose will happen if all the animals were to be removed from the pond without disturbing the plants, if it were possible to do so?
 - f. If the water in the pond were to dry up, what will happen to the organisms?
 - g. What would happen if the water in the pond were to suddenly increase in its temperature to twice the original?
 - h. What would happen if a layer of oil covers the entire surface of the lake and cuts off the air from being in contact with water?
 - i. Make a generalised statement about the relationship of biotic and abiotic components in an ecosystem. Will this be true in any ecosystem? If your answer is yes, then the statement made is a generalised statement.
8. Present a problem (even a hypothetical one, although a real existing problem would be more instructive).

Example: A lake ecosystem contains planktons, diatoms, algae, wrigglers and larvae of insects, tadpoles, fish, mollusks and other organisms. The water is normally clear except when periodic heavy rains bring in river water that is muddy and sandy.

- a. If left untouched by human activities, what do you suppose is likely to happen to the lake eventually?

Suppose the lakeside area is declared open to human habitation. Settlers came and within five years' time, the lakeside area was filled with houses.

- b. What is likely to happen to the lake? Who could have caused this?
9. Have a debate on the issue: Human settlers cause the degradation of environment in which they settle.

The group that says "Yes" must also answer "Why so? "

The group that says "No" must also answer "Why not? "

10. Extend the learning by assigning student teachers to write up their answers to the following questions:
 - a. What other kinds of ecosystems are there?
 - b. What makes each one of the above that you named an ecosystem?
 - c. Therefore what are the distinguishing characteristics of an ecosystem?
11. Collect the written assignments and discuss their answers. Let the student teachers question and answer each other with the supervisor acting only as mediator or facilitator in the exchange of ideas.

Unit 2

This unit was developed by working group II under the chairmanship of Dr. Siti Hawa Ahmad.

Dr. Siti Hawa Ahmad led the discussion on how to proceed with the workshop vis-a-vis the area to be discussed and developed. After much deliberation the group decided that the crux of the modules is aimed at enabling the teachers in pre-service and in-service training to teach Environmental Education in the primary schools. Hence the group deemed that it would be best to attempt to develop certain guidelines for structuring a module to train teachers to teach and inculcate values related to environmental education for Year 4 pupils (9+) in Health Education at primary school level. One of the competencies listed in the UNESCO publication, entitled "Strategies for the Training of Teachers in Environmental Education: A Discussion Guide for UNESCO Training Workshop on Environmental Education (1980)" was adopted as a launching point.

The following points were the vital information used for developing the lesson:

1. "... effectively implement the following methodologies to achieve environmental education goals:
 - a. outdoor education methods;
 - b. affective education methods (e.g. values clarification, Banks' inquiry model, moral dilemma model);
 - c. simulation games (including role playing)¹
2. The approach adopted was infusion of environmental education component into Health Education.
3. The entry point in Health Education is the topic of Cleanliness of the Environment.

General Objective

To enable teacher trainees/teachers to effectively implement the following methodologies to achieve environmental education goals:

1. outdoor education methods

¹UNESCO, *Strategies for the Training of Teachers in Environmental Education: A Discussion Guide for UNESCO Training Workshop on Environmental Education*, 1980, p. 32.

2. affective education methods (e.g. values clarification, Banks inquiry model, moral, dilemma model)
3. simulation games (including role playing)

Specific Objective

To enable the learner to:

1. utilize various approaches to infuse the concept of cleanliness of the environment into Health Education at the primary level.
2. apply the values clarification, Banks inquiry model, moral dilemma model to teach and create an awareness towards cleanliness of the environment.

Content

1. Knowledge

The concept of cleanliness

The concept of healthy living

The need for a clean environment

The steps to be taken to keep the environment clean and beautiful

2. Competency

The ability to appreciate relationships and interaction between cleanliness, healthful living, germs, sickness, in a beautiful environment.

The ability to reason and to recognise the importance of keeping a clean and beautiful environment.

The ability to clarify values and make decisions about the environment.

The ability to initiate positive steps in valuing the environment.

3. Attitudes and values

The desire for a clean and beautiful environment

The love and care for a healthy environment

Strategy

1. Inquiry approach based on outdoor activities
2. Affective methods— values clarification, Banks' inquiry model, moral dilemma. This strategy should enable the teacher to gauge the level of readiness of the pupils and to plan, motivate as well as generate thinking which could lead to the formation of good habits.
3. Simulation games

Evaluation

1. Assessing cognitive level through written tests.

2. Assessing affective level through observation by teacher. Take for example, the teacher can lead his pupils for a walk in the school compound. During the walk, he observes pupils' reactions and behaviour related to the cleanliness of the school compound. Based on such similar activities conducted over a period of time the teacher can obtain a profile of each pupil. This information can be utilized as a first formative evaluation.

Unit 3

This unit was developed by working group I under the chairmanship of Azian bte Tengku Syed Abdullah.

Participants of the workshop agreed to develop a teaching/learning unit based on the following guidelines:

1. Identify local environmental issues/problems that are science related.
2. Locate plug-in points in science curriculum suitable for infusion of environmental concepts and issues.
3. Prepare a list of content of the relevant scientific and environmental concepts involved.
4. Develop teaching/learning strategies and activities appropriate for teaching/learning of environment.

The group decided on 'Solid Waste Disposal' as an environmental issue which will be developed in a teaching/learning unit of the pre-service secondary science teacher education. The content of the environmental issue to be discussed could be infused into the school science curriculum of the various countries for example in the following topics of the science curriculum:

1. 'Land and its resources' — Land pollution in Grade 9 (Malaysia)
2. 'Man and the Environment' in Grade 12/3rd class of senior high school (Indonesia)
3. 'Man and the Environment' in Science I Grade 7 (Philippines)
4. 'Man and the Environment' in Grade 9 (Thailand)

The competencies that have been selected are from the UNESCO volume entitled "Strategies for the Training of Teachers in Environmental Education" (pg. 35) under the Conceptual Awareness level.

The competencies are as stated:

The effective EE teacher should be able to select, develop and/or implement curricular materials which will effectively make receivers aware of:

1. . . . how man's cultural activities (e.g. religious, economic, political, social etc.) influence the environment from an ecological perspective.
2. . . . the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.
3. . . . the need for responsible citizenship action (e.g. persuasion) in the remediation of environmental problems.

Objectives

The objectives of the teaching/learning unit are to enable the teacher trainees to:

1. become aware of the problem of solid waste disposal and its consequences
2. understand the concept of materials flow and relate it to the situation
3. apply the concepts to everyday living such as healthy living habit formation, appreciation of the environment and moral obligation to society.
4. to take action in order to persuade others to be responsible in solving solid waste problems.

Contents

The contents suggested below could be taught through various activities and they are as follows:

1. Materials flow concept
 - entropy
 - efficiency
2. Sources of solid waste
 - domestic
 - industrial
 - agricultural
 - municipal
3. Types of solid waste
 - biodegradable
 - non-biodegradable
4. Consequences and effects
 - health
 - pollution (air, soil, water)
 - aesthetic
 - displaced resource
 - financial
5. Solutions to the problems of solid waste disposal
 - recycling/salvaging
 - disposal by incineration or by dumping followed by refilling the land (to be used again in the near future for development)
 - sorting solid waste before disposal (reusable/non biodegradable) whichever is most applicable
 - reduce waste by turning it (or some of it) into something useful

- legislation (existing laws or formulate new legislation for suggestion to law-makers)

Suggested Activities

The following activities are suggested for the teacher trainees in the teaching/learning process during class periods or extended into co-curricular activities. The activities are not exhaustive and those that can be effectively used to teach solid waste disposal issues are as follows:

1. Use of films, slides, pictures, charts followed by discussion.
2. Conduct a survey to identify kinds and average amount of solid waste thrown from each household, housing area, beaches, town area etc.
3. Talks by resource persons from various agencies in relation to waste management.
4. Action-oriented activities such as clean-up campaigns, volunteer groups to render services to community, etc.
5. Visits to factories which have proper waste disposal system and good management.
6. Project works and experiments to transform certain kinds of solid waste into useful items.
7. Carry out competitions such as 'Art in garbage competition'.
8. Brainstorming sessions to determine management and alternative uses of solid wastes.
9. Role playing and simulations to encourage decision-making skills concerning solid waste disposal and utilization.
10. Science clubs to promote attendance to public hearings on issues where solid waste management experts are present.

Evaluation

In terms of evaluation, the group decided that continued evaluation should be carried out on teacher trainees' performance throughout their training period.

The pre-service teacher also needs (1) to become aware of the means of testing issue-based science learning and be able to design test items (2) to feel confident in assessing affective objectives.

Unit 4

This unit was developed by working group II under the chairmanship of Mr. Nagendralingan Ratnavadivel.

General Task

1. Aim – to develop guidelines for a sample module for teaching a unit for in-service training of science teachers and supervisors for secondary schools.
2. Context of the unit – The unit is on 'Industrial Waste' which could comprise a number of sub-units.

Objectives of the Unit

At the end of this unit, the in-service trainees should be able to:

1. appreciate the nation's need for industries as well as the proper utilization and disposal of industrial waste.
2. understand that industries produce useful products as well as industrial waste.
3. identify the sources, types and uses of industrial waste.
4. understand the effects of industrial waste on the environment.
5. identify possible solutions to reduce the problem of industrial waste.

Content of the Unit

The contents will cover the following:

1. The need for industries in the economic development of the country.
2. Types of industries and their locations (e.g. Primary industries, manufacturing, food, etc.)
3. Types of industrial waste generated from the industries.
4. Impact of industrial waste on human health, on the environment, and on productivity.
5. Treatment of unusable industrial waste.
6. Learner as a consumer.

Strategies for Teaching

This unit is participant-centered, inquiry-based and activity-oriented.

1. Group work: Data collection on:
 - a. National Economic Policy related to industries.
 - b. Environmentally-related laws and regulations of the country pertaining to industries.
 - c. Industrial master plan.
2. Discussions using affective educational methodology to develop an overview of the need for industries in the economic development of the country.
3. Project work on identifying:
 - a. types of industries
 - b. their location
 - c. raw material used
 - d. products
 - e. by-products and wastes

4. Case-studies on specific industry to identify:
 - a. the ways of recycling and using industrial waste as well as the final disposal of unusable waste.
 - b. the impact of the industrial waste on health, environment and productivity.
5. Individual activity to assess one's behaviour and values towards the consumption of manufactured goods.
6. Role playing and simulation.

Evaluation

The formulation of evaluation instruments for use as follows:

1. Assessing project reports
2. Assessing involvement and presentation
3. Assessing quality of discussions

Competencies Involved

The operation of this unit would involve the utilization of almost all the competencies listed in the document 'Strategies for the Training of Teachers in Environmental Education – A Discussion Guide for UNESCO Training Workshop on Environmental Education 1980.'

Unit 5

This unit was developed by working group I under the chairmanship of Mr. Wuryadi.

Introduction

The workshop group decided to identify an environmental issue to be developed into a teaching/learning unit of the social sciences for pre-service teacher education. Some of the issues suggested were

1. sanitation
2. river pollution
3. environmental problems created by housing development

The third suggestion was taken up by the members.

The environmental dimensions will be infused into the various social science content taught in secondary schools and the teacher trainees are expected to incorporate them whenever possible in the teachings of these subjects below:

1. Economics
2. Sociology (Indonesia, Thailand)
3. Geography
4. Moral/Ethics
5. Civics
6. History
7. Living Skills (Malaysia) etc.

The infusion can also take place through the teaching methodologies of the various subjects.

Competencies Required of an Effective Environmental Education Teacher

Two areas of competency level have been identified for an effective environmental education teacher is at the conceptual awareness and investigation and evaluation levels which are stated in the UNESCO volume entitled 'Strategies for the Training of Teachers in Environmental Education' (page 35-36).

Objectives

At the end of the teaching/learning unit, the trainee teachers should be able to:

1. develop awareness of the broad effects of man's activities and interactions on the social and physical environment;
2. develop understanding of environmental problems associated with housing developments;
3. take actions to reduce environmental problems and improve the social environment.

Conceptual Map

Processes involved in housing developments		Problems
1. Project proposal	—	Political, Economics
2. Project approval	—	Political, Economics
3. Land clearing	—	Soil erosion, drainage, situation, flash floods, deforestation
4. Develop buildings	—	amenities (electric, water supply, clinics etc) migration finance materials technology
5. Occupancy of buildings	—	social problems cross cultural interaction education infrastructure
6. Impact on the surrounding areas	—	natural industrial

Content

The content covers the various stages in the development of housing projects and environmental problems encountered in the process.

1. Planning Stage
 - a. Sound rationale for project
 - b. Environmental impact considerations

- c. Socio-economic considerations
- d. Socio-cultural considerations

Approval depends on consideration by authority.

2. Land clearing stage
 - a. soil erosion/situation
 - b. drainage
 - c. effects of deforestation
 - d. noise pollution/air pollution
 - e. flash floods
3. Development of building stage
 - a. workers migration
 - b. amenities (water and electricity supply, roads, schools, parks, clinics, etc.)
 - c. finance and materials
 - d. supply of materials
4. Occupancy stage
 - a. social problems
 - b. cross-cultural interactions
5. Impact on surrounding areas
 - a. natural
 - b. industrial

Agencies/authorities involved are to monitor and enforce compliance with the law during stages 1-4.

Teaching Strategies

The teaching strategies suggested below could be utilised in the classroom or extended to co-curricular activities. They are as follows:

1. exposure to environmental problems arising from housing projects through the use of films, slides, posters, exhibitions, photographs, documents, etc.
2. discussions/debates
3. role-play and simulations
4. case studies on housing estates under development
5. field trips
6. project works
7. campaigns carried out by community groups/associations where the trainee is a member.

Evaluation

Evaluation of the teaching/learning of this environmental dimension in the various social science subjects could be carried out according to the methods suggested below:

1. situation-reaction test
2. writing of essays and assignments
3. observation of simulated situation followed by reporting
4. observation report and recommendations for action
5. rating-scale to measure knowledge values, action orientation and attitudes and ability levels.

Conclusion

For the purpose of preparing a lesson plan in teaching this aspect in the various social science subjects, the teacher educator should:

1. choose the content from the list suggested that is relevant to his subject area.
2. develop behavioural objectives to achieve desired competencies.
3. identify proper resource materials/resources to carry out the learning process.
4. plan his teaching strategies suitable to the content chosen.
5. develop motivational strategies to encourage the learning chosen.
6. design activities in line with the objective specified.
7. develop evaluation methods for
 - a. self-evaluation
 - b. trainee evaluation
 - c. program evaluation

Unit 6

The group under the chairmanship of Mr. Nagendralingan Ratnavadivel deliberated on the objectives of in-service training as contained in Environmental Education Series 10. It was finally agreed to devise a teaching unit based on objective (8). The project of the workshop was as follows:

General Objective

To familiarise social science teachers and supervisors with the development of lesson plans and the preparation of teaching materials in the form of units of modules, etc. on the environmental dimension of secondary school social science subjects.

Specific objective

At the end of the unit, the participants would be able to develop lesson plans and teaching materials related to aspects of environmental education in a specific social science discipline.

Social science discipline identified: Geography

Topic

Soil Erosion – (The target group being an in-service group it is assumed that they would have a certain level of competency, both academic and professional in relation to the subject.)

Contents

1. Definition of soil erosion
2. Forms of soil erosion
3. Causes of soil erosion
 - a. natural causes: e.g. flood, landslide, rainfall, wind, sea
 - b. man-induced causes: e.g. deforestation, land development, development of infrastructure
4. Effects of soil erosion
 - a. degradation of soil
 - b. siltation
 - c. economic impact
 - d. changes in coastline
 - e. settlement
 - f. fishing industries
 - g. pollution
 - h. destruction of marine life
5. Needs for and means of prevention and overcoming soil erosion, e.g. need to strike a balance between development and soil conservation

Strategy

The approach is interdisciplinary and could use the following methods:

1. problem-solving (e.g. moral dilemma can be used as a technique)
2. values clarification (e.g. brainstorming can be incorporated to bring about the desired effect)

Sources of Materials

The learner should be able to identify sources of materials to teach the above content. Some of the sources are given below:

1. government agencies
2. nongovernmental agencies (NGOs)
3. individuals
4. personal observations and experiences

Types of Materials

1. books
2. documentaries
3. journals

4. newspapers and periodicals
5. research findings
6. reports and conference papers

Evaluation

Evaluation can be conducted in the form of formative and summative evaluation. Formative evaluation can be conducted throughout a particular lesson. Summative evaluation can be conducted at the end of a particular lesson or based on the result of the summative evaluation of a series of lessons.

Evaluation can be in the form of situational tests, project work or short essays.

The group felt that it is necessary for a learner to be able to structure a proper format for a lesson. Hence an attempt was made to format a guideline. It is as follows:

Stages	Time	Content	Teaching aids	Strategy	Teaching/Learning activities	Evaluation (Formative)	Comments
Set induction							
Development of lesson							
(I)		The effects of soil erosion caused by infrastructure of roads and highways	Pictures Slides Newspaper cuttings	Values clarification and problem solving	(I) Learners are shown a series of slides: (a) land before development (b) land after development (c) effect of erosion (d) land slides	Evaluation on learner's ability to: (a) describe (b) explain (c) reason (d) evaluate (orally)	
(II)					(II) Learners are asked to compare and explain what is shown in the slides		
(III)					(III) Learner response to questions asked by teacher and peers leads to the attainment of the objectives of the lesson in the form of (a) awareness of the problem (b) values related to the need for road construction and the conservation of soil		
Conclusion							
*Evaluation (Summative)	*Oral/written short questions covering salient points of the entire lesson in a proper sequential method. This would enable the teacher of not only evaluate the effectiveness of the lesson but also help in reinforcing the content/skills/values taught.						

**VII. SUGGESTED DOCUMENTS AND ACTIVITIES ON THE INCORPORATION
OF ENVIRONMENTAL EDUCATION INTO TEACHER EDUCATION TO
BE DEVELOPED BY IEEP AT SUBREGIONAL, REGIONAL AND
INTERNATIONAL LEVELS**

Suggested Activities

1. Out-of-school science activities.
2. Translation of UNESCO materials into local languages.
3. In-service teacher training in EE (UNESCO to provide documents and advisory services).
4. Symposium or training seminars on EE in religious studies/Moral Education.
5. Action learning on EE (national or international level)
6. Pilot studies in different countries to demonstrate how EE can be incorporated into existing curricula.
7. Pilot studies in selected schools to study impact, practicality, etc.
8. Evaluation of EE programmes (formative, summative, continuous with monitoring from UNESCO).
9. Series of seminars/workshops to develop curriculum on EE, identify subjects which are universal which can incorporate EE, and prepare resource materials for all participating countries.
10. Teachers should be sent for training courses on production of low cost materials on EE.

Suggested Documents

1. Documents to infuse EE into teaching of languages.
2. Documents on action learning on EE.
3. Adaptation of UNESCO documents by teacher educators (produce curriculum guide).
4. Documents on basic knowledge in EE for teachers (research based).
5. Evaluation guidebooks on guidelines for evaluation of values and skills in EE.
6. Documents on EE for vocational schools.
7. Documents on EE for training of housewives.
8. Curriculum framework on EE for 1, 2, 3 level.
9. Documents on games on EE for pre-school children.

10. Resource materials on EE which is closely related to science curriculum (Malaysia).
11. Produce modules with guidelines from UNESCO.

Suggestions on Utilization of Materials

1. Get feedback on whether materials have been utilised. Most teachers do not even have access to the materials.
2. UNESCO sends documents to different countries via
 - a. National Commission of each country
 - b. Connect
 - c. Institutions that collaborate with UNESCO in certain projects.
3. Modality of reaching out to teachers in the rural/outlying areas should be given some thoughts.

e.g. use of mass media such as TV via sattelites but constraint is that not all places have the receivers.

This depends very much on local resources, personnel, etc.

VIII. SUGGESTED METHODS AND INSTITUTIONS FOR UTILISATION OF THE MODULES

In the course of the seminar six modules were presented to the participants. These modules are subsequently deliberated upon in Workshops I, II and III. Consequently, suggestions and proposals were offered and discussed at the subsequent plenary sessions.

The participants are of the opinion that all the modules introduced at the seminar are of great value and represent a wealth of invaluable resource vis-a-vis the teaching of environmental education in the participating countries. These modules can be utilised in the teacher education programmes of the participating countries at both the pre-service and in-service levels as well as in primary and secondary teacher education programmes. They can be utilised in the following manner:

1. *Adopted in toto*
2. *Adapted via*
 - a. *Infusion into the existing teacher education curriculum content, specifically into science and social science subjects which contain aspects of environmental education.*
 - b. *Integration into the existing teacher education curriculum content, particularly with science and social science subjects which already have topics which lend themselves well to environmental education.*
 - c. *Integration via the teaching methodologies of the science and social science subjects, existing in the teacher education curriculum, which have aspects of environmental education. This ought to be done without much alterations to the existing content. This could be a useful process to avoid unnecessary review of the curriculum in terms of the technicalities involved in curriculum planning and management.*

This method would be a cost-effective measure in realising the objectives of environmental education in the participating countries.

The adoption/adaptation processes identified earlier can possibly be undertaken in each of the participating countries by the following agencies:

Indonesia

- a. teacher education schools at the district level
- b. The Institute of teacher training and education
- c. Faculties of education of selected universities

Philippines

- a. Institute for Science and Mathematics Education Development, University of the Philippines
- b. Bureau of Elementary Education and the Bureau of Secondary Education, Department of Education, Culture and Sports
- c. Faculties of education in selected universities

Sri Lanka

- a. colleges of education
- b. teacher training colleges
- c. curriculum development centre

Thailand

- a. Teacher Training Department, Ministry of Education
- b. Faculties of education in selected universities

Malaysia

- a. Teacher Education, Ministry of Education
- b. The Curriculum Development Centre, Ministry of Education
- c. The Technical and Vocational Division, Ministry of Education
- d. The National Institute of Educational Management
- e. The Schools Division, Ministry of Education
- f. Faculties of education of selected universities

IX. CONCLUSION

From the country reports and ensuing discussions it became evident that the major environmental problems of Indonesia, Malaysia, Philippines, Sri Lanka, and Thailand are quite similar — mainly that of pollution due to industrialisation, depletion and degradation of natural resources such as forests, fisheries soil, and mineral resources, the degradation caused by rapid population growth particularly in urban areas and the resulting housing problem and waste disposal problem in congested urban areas.

It was noted that environmental education as an environmental management strategy toward solving environmental problems is not only acceptable but has already been instituted in the five participating Member States. It is therefore reasonable that such an educational strategy and action be pursued, improved, and refined.

This seminar-workshop has attempted to improve and refine the teacher training aspect of environmental education. The week of intensive work consisting of module presentations, discussions, and workshops has accomplished a great deal in terms of (1) sharing of experiences which provided the much-needed encouragement to fellow environmental education specialists/teacher educators to persist with renewed energy in their work, (2) exchanging ideas which enabled the participants to glean the most workable and most effective instructional strategies and to identify appropriate topics for certain year levels.

The objectives of the seminar have provided the direction for work of the participants. Thus, strategies in curriculum development and teacher training in environmental education have been presented and studied, efficient ways of using the teacher training modules and institutions for their local adaptation of the modules have been identified, documents and activities for teacher training in environmental education have been identified for future development, and finally some prototype teaching units have been produced.

The seminar recommends that Member States (1) engage in more curriculum development in environmental education going into more specifics of environmental education lessons for particular year levels, what subject to infuse them in, and how infusion is to be accomplished, and (2) conduct teacher training using these environmental education lessons as the basis for a teacher training programme.

APPENDIX 1

CENTRAL COMMITTEE

1. Assoc. Prof. Mohd. Shah Hj. Lassim – Chairman
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2. Mrs. Fatimah Hanum Mohamad
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Chairman	Dr. Kamariah Hj. Abu Bakar
Secretary	Miss Halimatun Halaliah Mokhtar Mr. Mokhtar Hj. Nawawi
Secretariat	Miss Halimatun Halaliah Mokhtar Mr. Mokhtar Hj. Nawawi Mrs. Lily Mastura Hj. Harun Mr. Muhammad Hasan Abdul Rahman Mr. Sidek Mohd. Noah Mr. Sharif Jaafar Mr. Amran Samek Mr. Ahmad Mohd. Isa
Food & Lodging	Mr. Abd. Majid Mohd Isa Mr. Ma'rof Redzuan
Transportation & Tour	Mr. Kamarudzaman Aribi Mrs. Noorul Huda Abd. Hamid Mr. Mohd. Nizam Jaafar Mr. Hamudin Samin Mr. Mazlan Yong Mr. Rahim Bakar
Publicity	Mr. Rahmat Ismail
Academic Program	Dr. Sharifah Mohd. Nor Mr. Zul Azlan Hj. Hamidin Mr. Edwin Malachi Mr. Rosli Talif Mrs. Yong Poh Wing Mrs. Brenda Kam Mrs. Nora Mohd Nor Miss Noor Liza Modh Nor

APPENDIX 2

TIMETABLE OF WORK

Sub-Regional Seminar on Teacher Training in Environmental
Education for Asia, 15-22 November, 1987

P r o g r a m m e

Sunday 15

Arrival of participants

Pre-registration and accommodation at the Centre for Extension and
Continuing Education, Universiti Pertanian Malaysia

Monday 16

08:00 Registration

08:30 Participants and guests take their seats at the International Conference Hall

08:40 Arrival of Deputy Minister of Education, Malaysia

08:45 Welcoming Address by Chairman of Seminar Central Committee,
Assoc. Prof. Mohd Shah Hj. Lassim, Dean, Faculty of Educational
Studies, Universiti Pertanian Malaysia

09:00 – 09:15 Welcoming Address by UNESCO Representative

09:15 – 09:45 Opening Remarks by Deputy Minister of Education, Malaysia

09:45 – 10:15 Tea Break

10:15 – 10:45 SESSION I

Chairman : Prof. Dato' Dr. Ariffin Suhaimi (Deputy Rector of
International Islamic University, Kuala Lumpur)

Keynote Address on UNESCO-UNEP International Environmental
Education Programme by UNESCO Representative

10:45 – 11:00 Election of Bureau of the Workshop

11:00 – 13:00 Country Report I

Philippines
Malaysia

13:00 – 14:30 Lunch

14:30 – 16:00	SESSION 2
	Country Report II
	Sri Lanka Thailand Indonesia
16:00 – 16:30	Summary of Country Reports
16:30 – 17:00	T e a B r e a k
17:00 – 18:00	Trip to Kuala Lumpur

Tuesday 17

08:30 – 10:30	SESSION 3
	Chairman: Assoc. Prof. Dr. Khalid Mohd. Nor (Deputy Vice Chancellor, Universiti Pertanian Malaysia)
	Strategies for the Training of Teachers in Environmental Education by UNESCO Representative
10:30 – 11:00	T e a B r e a k
11:00 – 13:00	SESSION 4
	Presentation of:
	EE Series 5: Module for Pre-service Training of Teachers and Supervisors for Primary Schools
	Presenter: Mr. Mokhtar Hj. Nawawi, Universiti Pertanian Malaysia (University of Agriculture Malaysia)
	EE Series 6: Module for In-service Training of Teachers and Supervisors for Primary Schools
	Presenter: Dr. Siti Hawa Ahmad, Pusat Perkembangan Kurikulum, Kementerian, Pendidikan (Curriculum Development Centre, Ministry of Education, Malaysia)
13:00 – 14:30	L u n c h
14:30 – 16:30	Workshop I
	Group I – Development of Prototype EE
	Group II – Materials for incorporation into teacher education at the primary level
16:30 – 17:00	T e a B r e a k
17:30 – 18:30	Universiti Pertanian Malaysia Campus Tour

20:00 – 21:30 Dinner hosted by Faculty of Educational Studies, Universiti Pertanian Malaysia

Wednesday 18

08:30 – 10:30 SESSION 5

Presentation of:

EE Series 7: Module for Pre-service Training of Science Teachers and Supervisors for Secondary Schools

Presenter: Dr. Ahmad Badri Mohamad, Universiti Kebangsaan Malaysia (National University of Malaysia)

EE Series 8: Module for In-Service Training of Science Teachers and Supervisors for Secondary Schools

Presenter: Miss Indra Somasundram, Maktab Perguruan Seri Kota (Seri Kota Teacher's College)

10:30 – 11:00 Tea Break

11:00 – 13:00 Workshop II
Group I – Development of Prototype EE
Group II – Materials for incorporation into teacher education of secondary science

13:00 – 14:00 Lunch

14:00 – 15:30 Polishing of Workshop Reports

15:30 – 18:30 Visit to Tanjung Tuan, Port Dickson

20:00 – 21:30 Dinner hosted by the YAB Menteri Besar (State Chief Minister) of Negri Sembilan at Tasek Hotel, Seremban

Thursday 19

08:30 – 10:30 SESSION 6

Presentation of:

EE Series 9: Module for Pre-service Training of Social Science Teachers and Supervisors for Secondary Schools

Presenter: Assoc. Prof. Lily Chew, Universiti Malaya (University of Malaya)

EE Series 10: Module for In-serving Training of Social Science Teachers and Supervisors for Secondary Schools

Presenter: Assoc. Prof. Dr. Thilla Chelliah, Universiti Malaya (University of Malaya)

10:30 – 11:00 Tea Break

11:00 – 13:00	Workshop III Group I – Development of Prototype EE Group II – Materials for incorporation into teacher education of secondary social science
13:00 – 14:30	L u n c h
14:30 – 15:30	Suggested Documents and Activities in Teacher Training in Environmental Education by UNESCO Representative
15:30 – 16:00	T e a B r e a k
16:00	Visit to the Promotion of Environmental Planning and Applied Studies (PEPAS) Agency (Universiti Pertanian Malaysia Campus)
Friday 20	
08:00 – 19:00	Field trip to Malacca
20:00 – 21:30	Dinner hosted by YAB Ketua Menteri (State Chief Minister) of Melaka at Air Keroh Country Resort, Melaka
Saturday 21	
08:30 – 10:30	SESSION 7 Study of Draft of Final Report
10:30 – 11:00	T e a B r e a k
11:00 – 13:00	SESSION 8 Discussion of Draft of Final Report
13:00 – 14:30	L u n c h
14:30 – 15:30	Closing session Acknowledgement by Chairman of Central Committee for Sub-Regional Seminar on Teacher Training in Environmental Education for Asia, Assoc. Prof. Mohd. Shah Hj. Lassim. Acknowledgement by group representative Speech by UNESCO Representative Closing Remarks by Vice-Chancellor, Universiti Pertanian Malaysia
15:30 – 16:00	T e a B r e a k
16:00	Kuala Lumpur tour (optional)
Sunday 22	D e p a r t u r e

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APPENDIX 3

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APPENDIX 4

LIST OF DOCUMENTS

Working Documents

1. Module for Pre-service Training of Teachers and Supervisors for Primary Schools (EE Series 5).
2. Module for In-service Training of Teachers and Supervisors for Primary Schools (EE Series 6).
3. Module for Pre-service Training of Science Teachers and Supervisors Secondary Schools (EE Series 7).
4. Module for In-service Training of Science Teachers and Supervisors for Secondary Schools (EE Series 8).
5. Module for Pre-service Training of Social Science Teachers and Supervisors for Secondary Schools (EE Series 9).
6. Module for In-service Training of Social Science Teachers and Supervisors for Secondary Schools (EE Series 10).

Country Reports

1. Country Report: Environmental Education for Teacher Training in Indonesia. Prepared by Mr. Wuryadi.
2. Country Report Malaysia. Prepared by Teacher Education Division, Schools Division, Curriculum Development Centre, Ministry of Education, Malaysia.
3. Country Report on Environmental Education in the Philippines. Prepared by Dr. Leticia Pojun Cortes.
4. Country Report. Prepared by De Silva N.S.R. Curriculum Development Centre of the Ministry of Education, Sri Lanka.
5. Country Report: An Overview of History and Development of Teacher Education Thailand in the Light of Teacher Training in Environmental Education for Asia. Prepared by Teacher Training Development, Ministry of Education, Thailand.

Reference Documents

1. Trends in Environmental Education since Tblisi Conference (EE Series 1). 1983.
2. Educational Module on Environmental Problems in Cities (EE Series 4). 1983.
3. Guide on Environmental Education Evaluation at School (EE Series 12). 1985.
4. Guide on Environmental Education Values Teaching (EE Series 13). 1985.

5. A Comparative Survey of the Incorporation of Environmental Education into School Curricula (EE Series 17). 1985.
6. The Balance of "Life-kind": An Introduction to the Human Environmental (EE Series 18). 1985.
7. Strategies for the Training of Teachers in Environmental Education.
8. Sourcebook in Environment Education.
9. Strategies for Developing an Environmental Education Curriculum.
10. Environmental Education in the Light of the Tblisi Conference.

APPENDIX 4.1

RESUMÉS OF COUNTRY REPORTS

INDONESIA

By Wuryadi

Environmental education is a life-long education dealing with, not only knowledge and environmental awareness, but also with individual and social participation in the management of the environment. Environmental education should consider the possible effects on the environment of activities in communities. In view of this, environmental education should take into account the realistic conditions of national and local environment as part of the course material. Environmental education should encompass both long-term as well as short-term programmes. It should also include professional and scientific specialisation programmes. Teacher training and education fall into the category of long-term programmes.

Major environmental problems are related to other human problems like uncontrolled population growth, the environmental stress caused by technology, and resource development, health, and international pressure. Technology alone cannot solve the problems effectively, unless the quality of human resources and institutions is improved.

Fundamental solutions could involve educating and training everyone, enforcing laws and regulations, ensuring efficient use of waste treatment technology, orientating resource exploitation, implementing the concept of eco-development at all stages of developmental activities, implementing appropriate technology for reutilising agricultural and domestic waste and developing proper teacher education and training in environmental education. The objectives of environmental education should start from a change in attitude to social responsibility for environmental conservation. In general, a good perception of the environment should be developed from the very beginning toward achieving awareness, understanding, willingness and ability to manage the environment.

Non-formal environmental education usually involves the nongovernmental organisations and sometimes governmental institutions. The main objective of non-formal environmental education is to develop social participation and social abilities to solve environmental problems. For example, water supply problems, domestic waste treatment, encouraging people to create appropriate technology and other similar problems require social participation for their solution.

In pre-service primary and secondary teacher training and education, issues about the environment are integrated into the core subjects (ie. science, social science, Pancasila Moral Education, religious education, and language) and supported by some co- and extracurricular activities. Programmes for in-service teacher training and education in formal institutions are still being prepared and developed to bring about an effective system.

Priorities for achieving pre-service and in-service training of primary and secondary school teachers in environmental education are directed toward an intensive study of the curriculum of the school to look for possible ways of integrating environmental education materials, the students' and teachers' readiness and understanding of environmental education, possible utilisation of local environment as learning resources, identification of environmental problems in the community surrounding the school, planning integrated teaching/learning activities, and carrying out a natural and social environmental impact studies and assessment of environmental education activities.

MALAYSIA

By Nagendralingam Ratnavadivel

The major environment problems are those related to the depletion of natural resources, pollution of the environment, disruption of the ecosystem, and lack of conservation of the environment. To surmount the identified problems, Malaysia has resorted to legislation and creating an awareness vis-a-vis environment via formal and non-formal environmental education. Some of the laws being enforced are the Environmental Quality Act 1974, Environmental Quality (Prescribed Premises) (Crude Palm oil) Regulation 1977, Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulation 1978, Environmental Quality (Sewage and Industrial Effluents) Regulation 1978 and the National Forestry Act 1984.

The aim of the current environmental education programme is to develop a population that is more aware of, and is concerned about the environment and its associated problems, and possesses the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones.

Formal environmental education is provided for in schools, teachers' colleges and universities. The implementation of the New Primary School Curriculum or KBSR (its acronym in the national language) saw the introduction of a new subject entitled 'Man and the Environment.' This is an integrated subject which includes elements of health, science, history, geography, and civics. The subject aims at providing knowledge, perception and positive attitudes towards the environment in a holistic context. The subject was piloted in 1984-85 in 30 schools and fully launched in all primary schools beginning 1986. The subject is introduced into the school curriculum at Year 4 and extends to Year 6 of primary education.

The secondary school curriculum at present has incorporated certain aspects of environmental studies into various subjects such as science (Integrated Science for Forms 1-3, Modern General Science for Arts stream students in Form 4-5, and Modern Biology for the science stream students), geography, agricultural science, and health science. The proposed Integrated Curriculum for secondary schools or KBSM (its acronym in the national language) has infused aspects of environmental education into subjects such as science and geography. These subjects aim at enabling students to understand and appreciate nature and to be responsible in the utilisation of natural resources and energy. These new dimensions in science and geography are expected to be introduced to secondary schools in 1989. At the tertiary level, the Universiti Pertanian Malaysia (UPM) offers a Bachelor's Degree in Environmental Science. The UPM also offers a course leading to a Bachelor's Degree in Fisheries in which oceanography and marine pollution form part of the curriculum. At Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM), environmental studies are offered as elective subjects at the post-graduate levels for students enrolled for the Diploma of Education course. The Universiti Teknologi Malaysia (UTM) has an Environmental Engineering Department in the Civil Engineering Faculty offering courses which include water quality management, water waste treatment, solid waste management and environmental quality control system.

Non-formal environmental education and training activities, on the other hand, are being conducted by government agencies such as the Department of Environment (DOE), the Wildlife and National Parks Department, Forestry Department and the Drainage and Irrigation Department, and by nongovernmental agencies (NGOs) such as the Malayan Nature Society, Environment Protection Society of Malaysia, Malaysian Institute of Management and various consumer associations. These endeavours mainly take the form of short training courses, production of educational materials for the general public, and organisation of talks and activities related to environmental topics particularly for school children. They also cooperate with schools, colleges and universities in conducting any form of environmental education activity.

The Ministry of Education through its Educational Television Division (ETV) includes environment-related documentaries in their ETV programmes for school children. However such programmes face various problems and constraints such as the lack of finance, expertise, training material and equipment. Also, environmental education programmes have yet to attain a high priority amidst competing priorities of economic and industrial development.

Pre-service primary and secondary teacher education in environmental education is catered for at the university level and the college level. Although no specific reference to environmental education is made in the overall objectives of teacher education, aspects pertaining to environmental education are in fact found in the objectives of particular subjects of the Teacher Education Curriculum of the Teachers Colleges. The teacher education curriculum is largely influenced by the school curriculum which is geared toward enabling the student teachers to teach the subjects offered in schools, both at primary and lower secondary levels. Hence the objectives are derived by linking the objectives of the school curriculum to those of the teacher training programme.

Thus environmental education aspects have been infused into the various subjects comprising the Teacher Education Curriculum. Some of these are Man and Environment, geography, agricultural science, science education, health education, and moral education. The first mentioned is catered for in Primary School Training Program (PSTP) and the rest, excluding Moral Education, are exclusively for the Secondary School Training Programme (SSTP). Moral Education is for both PSTP and SSTP. The universities prepare teachers for upper secondary school and subjects pertaining to environmental education, as mentioned earlier, are offered as electives.

Besides the curriculum, the co-curriculum of teachers' college also cater for environmental education via participation in the activities of clubs and societies such as the Consumer Club, Outdoor Recreation Club, Science and Society, and the Geographical Society.

If the curriculum deals with the dimension of awareness, co-curriculum deals with practical knowledge and organisational and management skills pertaining to activities on environmental education. Teaching materials and evaluation techniques utilised in the training of teachers in environmental education are invariably linked to the strategies employed in the teaching of environmental education in the primary and secondary school curriculum. Both the government agencies and the NGOs provide resources in the form of reading materials, empirical findings, talks and practical demonstrations at seminars or forums. However, there is still a pressing need for more specific teaching materials which would contribute effectively towards enabling the students to comprehend, evaluate, and solve problems pertaining to the environment.

In-service training vis-a-vis teacher education on environmental education is an on-going activity which is conducted by the professional division of the Ministry of Education. The training is geared towards the teaching of the school subjects in which aspects of environmental studies have been infused.

In the one year Diploma course at the Institut Pendidikan Sultan Idris (IPSI), environmental education is offered as an elective to course participants. In-service teacher education is co-ordinated by the Teacher Education Division of the Ministry of Education.

The priorities for achieving pre-service and in-service training of primary and secondary school teachers in environmental education include sensitizing the teachers to environmental education, creating an awareness, invoking a sense of responsibility, acquiring skills to assess and evaluate environmental problems as well as contributing towards the observation of environment. Any future development of curriculum on environment should involve an interdisciplinary or multidisciplinary approach and should be holistic in treatment. Strategies used should be related to the experiences of the student teachers in the pre-service and teacher trainees in the in-service programmes. Teacher education should motivate teachers not only to utilize materials but also to produce low cost or no cost materials.

PHILIPPINES

By L.P. Cortés

Political problems faced by the country since 1983 had temporarily deviated national attention from problems of degradation of the environment. It is only in the last quarter of 1986 that the National Environmental Protection Council (NEPC) of the Philippines began refocusing peoples awareness toward the country's environmental problems.

The NEPC's continuing study of the Philippine environmental profile led to the classification of the following as major environmental problems are coastal zone management, deforestation and soil erosion, pollution from toxic and hazardous substances, solid waste disposal and natural calamities.

Seen as lesser problems are critical life support systems such as shortage of water and timber supply, environmental health, and rapidly increasing population.

Degradation of the coastal zone is attributed to the use of dynamite and potassium cyanide for fishing, coral gathering in commercial quantities, siltation with mine tailings, the encroachment of human settlements on the seashore, industrial effluents and the conversion of mangrove swamps into fish ponds. The effect is shown by the declining fish catch.

Forest denudation is caused by forest fires, illegal logging, increased kaingin (slash and burn practice) due to population pressure. Reduced water yield from watersheds, soil erosion, and flooding are the effects.

Pollution caused by the proliferation of toxic and hazardous substances from the widespread use of chemical fertilizers and pesticides, and industrial effluents is degrading land, air, and water.

Urban centers in the Philippines, particularly Metro Manila, accumulate waste at the rate of one-half kilo per person per day. In Metro Manila this amounts to 4 million kilos of solid wastes daily.

Natural calamities like the tropical cyclones called typhoons, earthquakes, and volcanic eruptions cause destruction that cost millions of pesos. The yearly typhoons destroy crops, domesticated animals, homes, infrastructure, and cause the loss of lives.

Both the Natural Environmental Protection Council (NEPC) and the Department of Education view education as a potent means of environmental management with long term effects. In the formal education system, an examination of the curriculum requirements for elementary and secondary levels shows a number of environmental concepts especially in science and social science. At these levels environmental concepts are infused/integrated into the science and social science courses. Environmental education is offered as an elective course in the secondary school.

Lack of textbooks and reference books and lack of trained teachers are the main problems encountered in the implementation of environmental education. There are only a few books written on environmental education for Filipino students. Most resource materials are of foreign origin.

In the tertiary level, courses on Environmental Chemistry, Environmental Sanitation, Resource Management, and other courses of environmental orientation have increased. The faculty handling these courses are generally highly qualified for the task. One university offers a master's degree program, Master of Science in Environmental Studies.

Non-formal environmental education is a special concern of many nongovernmental organisations (NGOs). Each of these organisations produce newsletters, brochures, brief reports on environmental events, issues, and concerns and send them to subscribing members. They pay air time to broadcast by radio and television topics or themes of environmental interest. They are successful in developing awareness about local environmental conditions and problems.

Only a few teacher training institutions offer a separate environmental education course. The course may be called Current Environmental Issues or Environmental Science. Most teacher training institutions incorporate environmental concepts into the science courses such as the Earth Science, Biology, Chemistry and Physics.

There is a proposal to require all teacher training institutions to include an environmental education course in their programmes. The proposal is likely to be approved and implemented next year.

Each course instructor takes care of the evaluation of learning acquired by the students. The evaluation of the course is conducted by the institution.

Large scale in-service training programmes have been implemented. In these programmes environmental concepts are integrated into the science and the social science subjects. Evaluation of the learning acquired by the teacher trainees is given near the end of the training period. However no follow up programme is instituted with the training to evaluate its effects on student learning.

The following are priorities for improved pre-service and in-service training:

1. the formulation of a master plan for environmental education to include all levels of the formal school system.
2. the specification of the points of entry for specific environmental concepts.
3. the linkage with industry and government agencies for on-site observation of environmental effects.
4. the increase in the number of in-service training programmes.
5. the development and production of resource materials that are based on Philippine conditions.
6. a networking of various groups (NGOs and teacher associations) for mutual support and enhancement of competence in spreading the message of environmental conservation.

There is need to define the philosophy, principles, objectives, and content of environmental education in all educational levels. The completion of the master plan is envisioned to accomplish this.

The social and political climate is ripe for a national thrust to develop people's consciousness of their environment. This is the time for a more aggressive implementation of environmental education.

SRI LANKA

By N.S.R. De Silva

In Sri Lanka, the environmental education gains priority at the national level. The protection and improvement of the environment have gained constitutional recognition. The country's education system responds adequately to the constitutional demands.

The main environmental problems are: the depletion of natural forest cover, coastal erosion, pollution of water, air and land, and the accumulation of garbage and non-biodegradable materials. Several solutions are introduced to protect the environment — the conservation of forest, the conservation efforts of government and nongovernment agencies, and the legislation.

The environmental education programme is introduced at three levels — primary, secondary and collegiate. At the primary level, the environmental education component is an integrated curriculum referred to as "Environmental Studies." At the secondary and the collegiate levels, environmental education is incorporated into specified disciplines.

The formal environmental education programme has been designed to provide learning experiences through activity-based teaching methods where the student actively participates in the teaching/learning process.

The non-formal environmental education programmes are many and varied, some organised by government institutions like the Curriculum Development Centre to which UNESCO has contributed much. There are a variety of programmes organised by nongovernmental organisations also.

One of the main problems encountered in informal education is the large number of pupils in a class which affects the teaching/learning process. Shortage of resources in schools such as equipment and apparatus, dearth of qualified professionally trained teachers, and, for urban schools, lack of suitable natural environments in the immediate surroundings, affect the teaching/learning process.

The colleges of education in the country play an important role in the national education programme for pre-service teacher training. This programme offers a three year course in a variety of subjects, two years of which are institutional and residential and one year internship.

In-service training programmes for primary and secondary teachers fall under three categories:

1. programme of teacher training colleges
2. distance education programme
3. in-service training programmes conducted by the Curriculum Development Centre

Programmes (1) and (2) are designed to eliminate the training of a back-log of professionally un-qualified teachers that have been recruited into the school system. The programme (3) is designed to up-date the content knowledge and teaching methodologies of professionally trained teachers who are already in the system and also to train university graduate teachers who teach at the collegiate level.

The Open University of Sri Lanka also has a two-year Diploma course in education for graduate teachers already in service.

It is hoped that in the teacher training programmes, environmental education shall be given priority. For proper implementation, initially the curriculum developers and the teacher educators must be fully aware of the environmental issues and the problems of the country. To ensure the attainment of this awareness, expertise is obtained from governmental and non-governmental institutions regarding such problems. They, in turn, give the teachers a thorough training to develop the competencies necessary to meet the demands of environmental education of the country.

In the open forum that followed the presentation of this country report, a question was posed as to how modules on environmental education were produced for teacher training. The representative from Sri Lanka replied that in the distance education scheme for primary education, the curriculum areas were first broken down into several units. Each unit is separately dealt with by a committee of teacher educators with the intention of formulating modules. Then under the guidance of resource personnel the material of the module is finalised for publication.

One of the participants found the Sri Lankan Open University System and the Distance Education Programme interesting and requested for more information about them. The speaker emphasised that the Open University System offers a two-year course leading to a Diploma in Education specially designed for graduate teachers who lacked professional training. The Distance Education Programme is an in-service training programme. Although such courses are correspondence-based, there are sufficient contact sessions.

It was also clarified that the Distance Education Programme was divided into various regional units to facilitate the management of the training programme.

As regards the personnel involved in material selection and content for writing, it was explained that these are directly managed by the teacher educators themselves having in view the existing syllabus of the various school levels.

The last question concerned the management and organisation of the environmental education programme in schools. The programme is under the direct control of the Ministry of Education. The curriculum content is determined by the Curriculum Development Centre of the Ministry of Education.

THAILAND

By Apirom Nanakorn

Today Thailand has become aware of the problems of environment at the national level. Like other Asian countries, Thailand has adopted industrialisation as the path to rapid economic development. Problems have arisen from the unplanned location of industries — primarily pollution and urban degradation, the latter, brought about by population congestion in urban areas where the industries and, therefore, employment are found. But congested sub-standard living places, coupled with inadequate facilities in terms of water supply, drainage, sewerage and sewage treatment, and refuse collection and disposal help create environmental health hazards.

Sheer increase in population also threatens natural resources with depletion and degradation. In addition mismanagement of these natural resources aggravates the problem. Forest resources are being depleted and degraded by the poor as well as the wealthy but greedy people. Poor rural folks confronted with starvation because of lack of land to cultivate are forced to cut down trees and/or burn them to create dwelling space and to grow crops. On the other hand, wealthy people also destroy the forests through illegal logging. At present only 28% of the total land area remains forested.

Fishing grounds are overexploited resulting in declining fish catch. The marine environment is one of the priority areas for conservation.

How do the elementary, secondary, and teacher training programmes respond to the environmental needs of the country? As part of the combined effort to promote environmental quality, environmental educational activities have also been planned.

The new elementary curriculum, introduced in 1978, is no longer made up of separate subjects. Instead it is divided into four integrated groups of experiences. Environmental education can be easily and effectively incorporated into any of the four components of the curriculum which are basic communication skills, life experience, character education, and work experience. Contents related to environmental concerns can easily be identified.

In the secondary level, an integrated approach toward environmental education is adopted. Contents relating to environmental concerns can find entry points in social studies and science.

As regards teacher education, there is no special training for teachers of environmental education at the certificate level. In the pre-service teacher training programme, environmental science courses are offered as electives under general science. Graduate studies in environmental studies is provided at the university level as in Kasetsart University which offers an M. Sc. Environmental Science, and in Mahidol University which offers an M. Sc. in Technology and Environmental Management and an M. Ed in Environmental Education.

For teachers who teach environmental education in an integrated form, no special training is given. The teacher's guide and some in-service training are considered adequate at present. A sourcebook for conservation of resources and the environment has been prepared by the Ministry of Education to help teachers deal with the new content more effectively.

Thailand has adopted the "infusion strategy" to bring environmental education to all levels of formal education. Natural science and social science have the benefit of absorbing the largest share of environmental concepts in this infusion.

The pre-service training in environmental concepts provided for student teachers is mostly restricted to a few conventional subjects. The limited experience and insights gained with such exposure cannot be expected to provide them with competencies needed to adopt the interdisciplinary approach. The in-service education courses specially designed to meet the actual curricular needs seem to be more effective because they can be flexible and free from constraints which characterize the rigidly institutionalised pre-service training.

APPENDIX 5

**WELCOMING ADDRESS BY ASSOCIATE PROFESSOR
MOHD. SHAH BIN HJ. LASSIM, DEAN FACULTY OF EDUCATIONAL
STUDIES AS CHAIRMAN OF THE CENTRAL COMMITTEE
OF THE SUB-REGIONAL SEMINAR ON TEACHER TRAINING IN
ENVIRONMENTAL EDUCATION FOR ASIA AT THE
UNIVERSITI PERTANIAN MALAYSIA
HELD ON 16-22 NOVEMBER, 1987**

Bismillahirrahmanirrahim

Sdr. Pengerusi Majlis,

Yang Berhormat Dr. Leo Michael Toyad, Deputy Minister of Education, Malaysia.

Yang Berbahagia Prof. Dr. Kamarudin bin Hj. Kachar, Deputy Vice-Chancellor (Student Affairs), Universiti Pertanian Malaysia,

Dr. Abdul Ghafoor Ghaznawi of UNESCO, Paris, Honoured Guests, distinguished foreign representatives, participants of the seminar, ladies and gentlemen.

Assalamualaikum w.b.t. and Good Morning.

The subject of a clean environment and healthy living, is today, a universal issue — a topic which frequently becomes lively debate at international forums. This morning we are about to begin another deliberation on similar issues — perhaps with a slight difference in the sense that we are to narrow down the discussion to the grassroot level in an attempt to study various strategies on how environmental consciousness could be approached through the schools. We are therefore, gathered here this morning, in this hall among professionals, teacher trainers, curriculum development officials and environmentalists with representatives from countries in the Southern Asian Region to discuss common approaches to environmental education for the young through the school curriculum.

It is indeed a great honour for Universiti Pertanian Malaysia to have been entrusted to lead this Seminar-cum-Workshop under UNESCO's auspices, and certainly it is a great privilege for the Faculty of Educational Studies to have been honoured with the nitty-gritty details of organising the same Seminar.

The officials attending the Seminar consists of a very select group of professionals involving less than thirty participants in all including observers with a representative each from Indonesia, the Philippines, Sri Lanka, Thailand and three from Malaysia. India, however, is unable to send a representative although an invitation had been extended through the relevant UNESCO National Commission. In addition to this, there are ten observers from Malaysia who have been invited to attend the Workshop.

Of course the deliberation would certainly be incomplete without the involvement of UNESCO itself, and this is resolved through the participation of Dr. Abdul Ghafoor Ghaznawi from the UNESCO's Headquarters in Paris, who has consented to deliver, in subsequent session, the Keynote Address on UNESCO-UNEP International Environmental Education Programme. Dr. Ghaznawi will be with us throughout the week and we hope to draw upon his expertise in the conduct of this seminar-workshop in suggesting relevant documents and appropriate activities for teacher training in environmental education.

It is the fervent hope and aspiration of the sponsors and organisers that in its deliberation the seminar would be able to focus attention to:

- study strategies in curriculum development and teacher training in environmental education;
- familiarise teacher educators with the content of a series of pre-service and in-service teacher training modules in environmental education prepared by UNESCO-UNEP International Environmental Education Programme (IIEP);
- explore efficient ways and identify institutions for local adaptation and use of the teacher training modules in the participating Member States; and,
- identify documents and activities in teacher training in environmental education to be developed by the International Environmental Education Programme.

We are indeed honoured by the presence of The Honourable Deputy Minister of Education, Dr. Leo Michael Toyad, who despite his tight schedule, has reserved the time and kindly consented to officiate the Opening Ceremony of the Sub-Regional Seminar on Teacher Training in Environmental Education for Asia. We are grateful to the Honourable Deputy Minister and thank you very much for your kind gesture.

The Universiti Pertanian Malaysia extends a warm welcome to all participants especially to our foreign guests for whom we have reserved accommodation in this premises itself — the Centre for Extension and Continuing Education (CECE). We are appreciative of the fact that in spite of your busy time table at home, you have set aside the whole week to be with us participating in this seminar and your contribution of your country reports. We wish you all an enjoyable stay at the 'Green Campus.' The Vice-Chancellor extends his 'Selamat Datang' and warmest regards to all participants. He is unable to be with us this morning as he is at this moment chairing the University Senate Meeting which is in progress now. The delegation of his presence is nonetheless represented in person by his distinguished Deputy, Y. Bhg. Prof. Dr. Kamarudin bin Hj. Kachar. Thank you Prof. Kamarudin.

We are deeply indebted to UNESCO for entrusting us to organise this seminar-cum-workshop with full sponsorship to include the necessary funding to make the seminar a success. Grateful thanks are accorded especially to Dr. Abdul Ghafoor Ghaznawi as the UNESCO's representative from the Headquarters in Paris for his untiring effort to see that the proposed Seminar is realised and for his part in presenting papers and expert contributions.

To the resumé writers who have studied and digested the various training modules and subsequently assumed the role of facilitators in their respective areas, we owe you many thanks for your consistent effort and the homework that you have so ably done.

To the various Chairmen of Sessions, particularly to Y. Bhg. Dato' Prof. Dr. Ariffin Suhaimi, the Vice Rector of the International Islamic University and Assoc. Prof. Dr. Mohd. Khalid Noor, the Deputy Vice-Chancellor (Development) of UPM who have kindly accepted to be Session Chairman, we express our gratefulness and sincere thanks.

During the course of the week, participants will also be conducted on a guided tour to related areas of interests in Negeri Sembilan and Melaka, and in this regard, we would like to place on record our gratitude to both State Governments for their kind hospitality in receiving the participants and subsequently entertaining them to lunch or dinner in the respective States.

To members of the Central Committee with representatives from the local UNESCO National Commission in Kuala Lumpur, the Ministry of Education and the Ministry of Science, Technology and Environment and to all members of the Organising Committee at UPM, we tender our sincere appreciation for your untiring contribution and hard work.

It would be inappropriate if similar appreciation is not accorded to the Director of the Centre for Extension and Continuing Education for being kind enough to allow us to use all the facilities that we require at this Centre including the Conference Hall, accommodation and catering services and to the Farm Director for providing support services particularly transport facilities.

Finally to all members of the staff and all others who have contributed one way or another in organising this seminar, we extend our gratitude and thanks for your continued support.

We are looking forward to a fruitful discussion and invaluable contributions from all participants, and may we wish once again that you have an enjoyable stay at Unviersiti Per-tanian Malaysia.

Thank you.

APPENDIX 6

OPENING SESSION STATEMENT

by

ABDUL GHAFOR GHAZNAWI
PROGRAMME SPECIALIST IN ENVIRONMENTAL EDUCATION
UNESCO, PARIS

Mr. Vice-Chancellor

Mr. Chairman,

Ladies and Gentlemen.

It is a pleasure for me to welcome you on behalf of Unesco to the Subregional Seminar on Teacher Training in Environmental Education for Asia organized, in the context of Unesco's Programme and Budget of 1986-1987, by the Faculty of Education of Universiti Pertanian Malaysia in collaboration with Unesco-UNEP 1;International Environmental Education Programme (IEEP).

The objectives of the seminar are (i) to familiarize teacher educators with the contents of the series of teacher training modules in environmental education prepared by IEEP; (ii) to prepare prototype environmental education units for incorporation into teacher training programmes; (iii) to identify institutions for local adaptation and use of teacher training modules in participating Member States; (iv) to enhance exchange of information and experience in the development of teacher training in environmental education in the subregion.

Inputs to the seminar are eight documents on curriculum development and teacher training in environmental education prepared under Unesco-UNEP International Environmental Education Programme (IEEP) by teams of teacher educators in Jamaica, India, Australia, USA, Kenya and Philippines and tested in two subregional training workshops on teacher training in environmental education in Jamaica and India in 1983. These documents will be presented at the seminar by resource persons from UPM and Unesco. Furthermore, another important input to the seminar is a series of country reports prepared by the participants of this seminar on the basis of an outline prepared and provided by Unesco with the purpose to enhance exchange of information on teacher training in environmental education.

The immediate output of the seminar will be a report which will contain deliberations of the seminar and resumes of working documents and country reports as well. The most important achievement shall be the commitments that may be developed on the part of this experienced group of teacher educators who as a result of this seminar would be taking necessary actions to incorporate environmental education into their ongoing teacher education courses and into the full spectrum of their respective teacher education systems when the appropriate occasions arise.

The work of the seminar will involve a presentation on the background and activities of Unesco-UNEP International Environmental Education Programme, presentation and discussion of country reports, presentation and discussion of eight working

documents, as well as group work to prepare three environmental education units in the context of primary teacher education, secondary science teacher training and secondary social science teacher training. The basic strategy in the work of the seminar especially in the group work is to go through the process of learning by doing.

Ladies and gentlemen,

Environment may be considered as the sum total of all the factors that affect an organism. Environment has its physical, biological, economic, political and socio-cultural dimensions all inter-related with each other. The environment is a whole or it has a holistic nature developed through its within ongoing forces and changes since its inception. In other words, the environment is a dynamic whole which continually changes and develops towards a more stable holistic nature.

Man is an integral part of the environment. There is a two-way reaction between man and the environment. That is to say they shape each other to reach a dynamic and stable man-environment relationship. It is to the advantage of man if this dynamic and stable man-environment relationship is maintained otherwise rapid disequilibria will put stress on one or both side which could lead to different consequences resulting in humanities disadvantages.

The study of the holistic nature of the environment, of the ongoing forces in the environment and their interactions with

each other, of the global environmental problems and their long-term impact on environmental conditions, and of the man-environment relationship and the consequences of stress on either elements of this relationship are the frontiers of knowledge that challenges environmental scientists, sociologists, economists, technologists, researchers politicians, etc.

This above knowledge is essential for a better understanding of the holistic nature of the environment, of the inter-relationships and interdependencies of its components on each other including that of man especially for his sound intervention in the environment for sustainable development. In this context, one can foresee high research priorities and achievements in this field in the future.

The process through which this knowledge is processed and transmitted to humanity for the wellbeing of the present and future generations is environmental education (EE). Thus, EE is a profound educational renewal that makes man understand himself, his relationship and interdependencies on the elements of the environment and the skills for his sound interventions in environment. In other words, EE is not simply an awareness of current environmental problems and their solutions but a fundamental education process that aims at providing humanity at all age levels, with environmental sensitivity, awareness, knowledge, skills, attitudes, commitments, ethical responsibilities and sound actions.

For achieving the above aim, one needs to embark on curriculum renewal through which environmental knowledge is processed for teaching/learning purposes for different age levels.

Teachers being responsible for implementation of curriculum in the classroom need to be educated through preservice and inservice programmes on the goals, objectives, guiding principles, concepts, methodologies, evaluation techniques in environmental education. For developing commitments for effective implementation of the curriculum, teachers should become involved in the process of the development of environmental development from the outset.

Education is a slow land time-taking process whose environmentalization will take many years or even some generations for the purpose of bringing the desired changes in the minds, attitudes, and actions of people for the protection and improvement of the environment as the sole known habitable place for humanity. It is, therefore, useful and urgent to take appropriate actions into this direction.

It is in this context that Unesco has taken numerous actions for the development of EE in the last decade among which are the preparation and organization of a series of international, regional, subregional, and national training seminars and workshops for key educational personnel on the development of environmental education. This seminar for Asia has also been conceived in this context.

Ladies and Gentlemen,

The reason for having this seminar organized at UPM is the interest and commitment of UPM in the development of environmental education which has been demonstrated through the successful organization of a Regional Conference on Environmental Education in ASIA Universities and Its Transfer in 1981 and the successful preparation and organization of a Subregional Training Workshop on Nonformal Environmental Education by the Development of Science and Environmental Studies of UPM in November 1985. It was at opening session of the above workshop on 18 November 1985 that I mentioned that if something happens twice it may happen thrice and, thus, it is a pleasure to be here today and to have the occasion to welcome you to this seminar which is the third one in a row organized by UPM in cooperation with Unesco. The final report of the last training workshop on nonformal EE was printed here by UPM and sent to Unesco which we distributed throughout the world. In the same way, we intend to distribute the final report of this seminar, after it is prepared and printed by UPM, to educational institutions and professionals active in teacher training in environmental education around the world. I should like to add that another major reason for having the seminar in Malaysia is to share, on the spot, the Malaysian innovative experience in curriculum development and teacher training in environmental education with its special emphasis on environmental education at elementary school level with the introduction of the subject of Man & the Environment from grade 4 to 6.

Your Excellency,
Ladies & Gentlemen,

On behalf of Unesco I want to thank the government of Malaysia, the Malaysian National Commission for Unesco, Universiti Pertanian Malaysia especially its Faculty of Educational Studies for facilitating the organization of this seminar. I am well familiar with the serious work requirements on the substantive and administrative aspects of the preparation and organization of such seminars. UPM is now an experienced institution in this regard and it is with appreciation to say that it has opened its door to international meetings particularly in sharing its experiences with experts from the educational institutions of the region. My thanks go to the Member States for accepting the invitation and sending their experts who have worked and prepared their respective country reports which they will present and discuss at the seminar for the purpose of enhancing exchange of information and experience in this field. I want to thank H.E. Mr. Anwar Ibrahim, Minister of Education of Malaysia for honouring us to be here today and to open this seminar whose results we hope could in due course further the development of environmental education as a measure for the improvement of the environment and its quality for the present and future generations.

APPENDIX 7

**SPEECH OF HONOURABLE DEPUTY MINISTER OF EDUCATION, MALAYSIA.
Y.B. DR. LEO MICHAEL TOYAD
AT THE OPENING OF THE SUBREGIONAL SEMINAR ON
ENVIRONMENTAL EDUCATION FOR ASIA
AT UNIVERSITI PERTANIAN MALAYSIA, SERDANG, MALAYSIA
PADA 16 NOVEMBER 1987**

Yang Mulia Saudara, Pengerusi,
Yang Berbahagia Prof. Dato' Dr. Nayan Ariffin,
Naib Canselor, Universiti Pertanian Malaysia,
Yang Berbahagia Dr. Abdul Ghafoor Ghaznawi,
Pakar Pendidikan Alam Sekitar, UNESCO Paris,
Para tetamu khas,
Para Perwakilan Seminar,
Tuan-tuan dan Puan-puan Hadirin Sekalian.

Salam Sejahtera dan Selamat Pagi.

Pertama-tama saya mengucapkan ribuan terima kasih kepada Penganjur Seminar ini kerana telah memberikan penghormatan kepada saya untuk bersama-sama di Majlis Perasmian pada hari ini. Saya ingin mengucapkan tahniah kepada seluruh Ahli Jawatankuasa Seminar ini dan Universiti Pertanian selaku Tuan rumah yang telah berusaha bersungguh-sungguh mengelolakan program ini.

Saya kira program pagi ini adalah sangat bermakna kepada Kerajaan Malaysia, kerana ianya merupakan pengiktirafan UNESCO kepada Malaysia kesekian kalinya menjadi pelaksana Seminar-seminar di bawah program UNESCO. Misalnya baru-baru ini juga UNESCO telah memberikan penghormatan kepada kita untuk menjadi tuan rumah kepada kursus 'UNESCO Regional Training Course on Book Publishing Business Management' pada 17 Ogos 1987. Ini semuanya adalah gambaran kepercayaan, keyakinan dan pengiktirafan UNESCO kepada usaha negara meningkatkan mutu pendidikan demi kepentingan sejagat. Hal ini semakin pula meyakinkan kita, apabila Y.B. Saudara Anwar Ibrahim, Menteri Pendidikan Malaysia, telah dipilih menganggotai Ahli Lembaga Pengarah UNESCO.

Bagi kita, kejayaan Y.B. Saudara Anwar Ibrahim sekali lagi bukan hanya semata-mata kejayaan peribadi beliau, bahkan merupakan kejayaan kita bersama, kejayaan Malaysia khususnya, kejayaan dan pengiktirafan kepada daya usaha Kementerian Pendidikan. Hendakna, kejayaan dan pengiktirafan ini dijadikan dorongan semangat untuk kita agar kita terus bekerja lebih kuat dan lebih 'Committed' dengan profession kita. Kita berdoa agar Tuhan terus memberikan kekuatan dan petunjuk kepada kita.

Di atas mukadimah awal saya sebentar tadi, izinkan saya berucap di dalam Bahasa Inggeris untuk faedah Tuan-tuan dan Puan-puan para perwakilan sekalian.

Ladies and Gentlemen,

To those who are here for the first time in Malaysia, I wish you a warm 'Selamat Datang' and others who have been here before 'Welcome Back.'

Let me thank the Organising Committee for inviting me to officiate at the opening of the 'Subregional Seminar on Teacher Training in Environmental Education for Asia,' and to say a

few words on this auspicious occasion. I would also like to thank UNESCO-Paris for the financial support provided to hold this seminar.

Ladies and Gentlemen,

Environmental Education has assumed added significance in view of the worsening environmental conditions of the world, in general, and of Asia in particular. It is felt that the deterioration of the environment has come about due to ignorance and public apathy concerning the importance of conserving and preserving the environment.

Ignorance and apathy amongst the general public concerning the degradation of the environment is quite widespread. Littering has been a major problem for years. The Malaysia public, at times, foster an unconcerned attitude towards proper garbage disposal. Even our rivers and waterways have not been spared.

Pollution from sources like industry, agriculture and municipality substantially affects the biotic and abiotic community, in general, and the human and non-human members of the community in particular. For example, the Rubber and Palm-oil industries had been the major contributors to the pollution of the environment. Discharge from these industries have polluted the rivers in Malaysia to an extent that conditions of the rivers were at an intolerable level. This has cost the government millions of ringgit in its effort to clean-up the waste generated by the public.

The industrial sector too has not been very vigilant in the disposal of their waste products. No doubt there are industries which are doing something to alleviate the problem.

However with the enactment of the Environment Quality Act of 1973, conditions have improved remarkably. The pollution level has been reduced by more than ninety-five per cent. This clearly indicates that it is feasible for the industrial sector to protect the environment against pollutants.

Even then, it is hoped that all industries would try to take the initiatives to voluntarily protect the environment against water and soil pollutants.

Economic development should be balanced by efforts to conserve and preserve the environment. There should be an environmental ethical obligation. Economic development should not benefit a few at a greater cost to many.

In so doing, they should regard themselves morally accountable for the effects of their industrial waste on society and the environment. To reverse these unhealthy practices and trends, it is my strong belief that the role of education, in particular, when it is directed at the old and young, could bring about the much needed and desired changes. To ensure the success of this education 'of the young,' educators must equip themselves with the know-how and strategies of how to inculcate awareness and the appreciation of nature and its surroundings. I am proud to say that our Malaysian primary school curriculum has embarked on the innovative step of integrating environment into a subject called 'Alam dan Manusia' (Man and his Environment). The 'Man and his Environment' curriculum is new and is to be taught to Std. 4-6 students of the primary schools. At present the curriculum is taught up to Std. 5. Next year it will be taught to Std. 6 students. The curriculum consists of five themes, all of which are built around the whole idea about Man and Man's responsibility to attain homeostasis, a state of equilibrium, in the environment. Integrated into the curriculum are science, geography, history, civics, and health concepts.

Needless to say, the process of integrating environment into a particular school subject could in fact be extended to other subject areas, for instance, language, science or even mathe-

matics, be it at primary or secondary level of the school curriculum. It is obvious that the teacher training institutions have an important role to play in the preparation of teachers in environmental education. It is my hope that an outcome of the seminar would be for the institutions to embark on programmes that are specifically tailored for the teaching of environmental education in their curriculum. So I believe that you, ladies and gentlemen are gathered here today in this institution to discuss some of the issues and strategies focussing on objectives highlighted by Dr. Abdul Ghafoor, in his welcoming address. The mass media also has an important role to play in environmental education.

It could provide a supportive role in the education process. It could help to disseminate relevant information thereby bringing about greater awareness and appreciation of the environment among members of the general public.

Ladies and Gentlemen,

As all of you subscribe to, and as exemplified by this gathering, what one would like to see is the citizens of Asia environmentally literate and willing to act on a set of values which are consistent with the ecological well-being of the biosphere. In this respect, I am convinced that now, more than ever, the Asian nations become more cohesive and cooperating through various means.

Investments in this direction, I believe, will result in better attitudes among the general public of the different nations. Thus I would like to take this opportunity to call for more linkages and cooperation among the nations of Asia in trying to make this world a much better place to live in for us and for the future generations.

Ladies and Gentlemen,

May I wish you much success in your 5 days of deliberations, and further success in your proceedings and later undertakings. Please convey our warm regards to your colleagues back home and may all delegates have fond memories of this seminar and workshop, and also of our country, Malaysia.

In the name of God Almighty, I have great pleasure in declaring this 'Subregional Seminar on Teacher Training of Environmental Education for Asia' officially open.

APPENDIX 8

REPORT ON FIELD TRIPS

FIELD TRIP TO TAUJUNG TUAN

A field trip to Tanjung Tuan was scheduled on 18 November 1987. Tanjung Tuan is located in the district of Port Dickson, Negeri Sembilan. At Tanjung Tuan the participants visited the lighthouse which was built more than a hundred years ago. It is situated at about 300 meters above sea level. Everybody had the chance to go to the top of the light house and observe the busy traffic in the Straits of Malacca. The participants could visually perceive the marine pollution evident in the environment. It was also observed that a colony of monkeys (macaques) inhabit the area around the hill. The high tide prevented a study of the effects of siltation from a nearby housing project on the mangrove forest and the coral areas. Mr. Yahya from the Forestry Faculty, Universiti Pertanian Malaysia, briefed the participants on the characteristics of a tropical mangrove forest. Thereafter, the delegation adjourned to a dinner hosted by the Menteri Besar of Negeri Sembilan. The Menteri Besar was represented by the State Director of Education. The participants found the trip interesting and educational.

FIELD TRIP TO PEPAS

An official visit to the PEPAS Office was made on 19 November from 4:00 – 4:45 p.m. The PEPAS Office is situated in the main campus of Universiti Pertanian Malaysia. PEPAS is the acronym for the World Health Organization's (WHO) Western Pacific-Regional Centre for the Promotion of Environmental Planning and Applied Studies (PEPAS). The participants were briefed on the activities of PEPAS by Dr. David Mage, the acting Director of PEPAS. A slide show and a photograph exhibition depicted the varied activities of PEPAS. PEPAS services are available mainly in the areas of:

1. Community water supply and sanitation
2. Environmental health in rural and urban development and housing
3. Control of environmental health hazards
4. Food safety

Dr. Mage also briefed the participants on the services offered by PEPAS. On the whole, the visit to PEPAS was very educational and beneficial.

FIELD TRIP TO MALACCA

The field trip on 20 November 1987 to Malacca took the participants of the seminar to a number of interesting and educational places. The first stop was at the Air Keroh 'Mini Malaysia' where the delegates were exposed to some cultural aspects of this country. Thereafter, the members adjourned for lunch at Sekolah Menengah Muzaffar Shah, a beautiful hilltop school. It was hosted by Mr. Zainen Mohamed, the assistant principal of the school.

The next stop was at the crocodile farm, after which the members visited the recreational forest. The members were impressed by the efforts taken by the Malacca state government in the preservation of national resources for public recreation.

Tea was then hosted by the 'Speaker Undangan' of Malacca at Air Keroh Country Resort, a resort set in serene and scenic natural surroundings. After some shopping in town, dinner was again in the Air Keroh Country Resort. It was hosted by the Chief Minister of Malacca who was represented by the State Director of Education, Mr. Hj. Ghazali buda Umar.

The members returned to the Universiti Pertanian Malaysia campus at 11:30 p.m.

APPENDIX 9

**CLOSING ADDRESS BY ASSOCIATE PROF. MOHD. SHAH
BIN HJ. LASSIM, DEAN, FACULTY OF EDUCATIONAL
STUDIES AND CHAIRMAN OF THE CENTRAL COMMITTEE
OF THE SUBREGIONAL SEMINAR ON TEACHER TRAINING
IN ENVIRONMENTAL EDUCATION FOR ASIA HELD AT
UNIVERSITI PERTANIAN MALAYSIA, SERDANG, ON
16-21 NOVEMBER, 1987**

Bismillahi Rahmani Rahim,

Saudari Pengerusi Majlis, Yang Berusaha Prof. Madya Dr. Mohd. Khalid b. Mohd. Nor, Timbalan Naib Canselor (Pembangunan) UPM, Dr. Abd. Ghafoor Ghaznawi, UNESCO's Representative, participants, ladies and gentlemen.

Assalamualaikum dan Good Afternoon,

I would like to take this opportunity to congratulate the participants in their deliberation for the last four days on six modules pertaining to the materials which cover pre-service and in-service training of primary and secondary teachers and supervisors in environmental education. I am certain that the modules have been thoroughly discussed and the outcome of these discussion will improve the materials. At this stage the materials are hopefully ready to be used for teacher training.

I am glad that the Faculty of Educational Studies, Universiti Pertanian Malaysia, has played a role in the process of producing and improving the much-needed materials for teacher training in environmental education. This workshop has given us not only the opportunities to be involved in material production, but the valuable experience gained in organising a regional seminar of this nature are also important to us. Many of our staff members have volunteered to help make this seminar a success. I am sure each and everyone of them has benefitted greatly in terms of experience, skills and knowledge of environmental education.

Ladies and gentlemen, as Chairman of the Central Committee, allow me to convey my thanks to various people and organisations for their support and contributions towards the success of this seminar.

1. To the Honourable Dr. Leo Michael Toyad, the Deputy Minister of Education, for his kind consent to declare open the seminar;
2. To Prof. Dato' Dr. Nayan bin Ariffin, the Vice Chancellor of UPM, for his encouragement, advice and consent in closing the seminar;
3. To UNESCO for sponsoring the seminar and providing the necessary funds, and especially to Dr. Abdul Ghafoor Ghaznawi whose personal involvement as UNESCO's representative has benefitted us greatly with his expertise;
4. To the Ministry of Education and the Ministry of Science, Technology and Environment for the support given to the seminar and sending us the representatives as members of the Central Committee;
5. To the paper presentors from UM, UKM, UPM, Curriculum Development Centre, Ministry of Education, Seri Kota Teachers College for their crucial contribution;

6. To the participants from Indonesia, Philippines, Sri Lanka, Thailand and Malaysia as representatives of the Member States;
7. To the observers who have been participating throughout the seminar for their contribution and involvement in the seminar;
8. To the Director, Centre for Extension and Continuing Education, and the Farm Director for all the support services provided by them;
9. To members of the Working Committee under the able leadership of Dr. Kamariah Hj. Abu Bakar who have worked very hard to organise the seminar to a successful end; and
10. To all other staff members of the Faculty and others involved in one way or another, who have been working behind the scenes ensuring the success of the seminar.

I would expect that there could have been some shortcomings on the part of the Organisers throughout the conduct of the seminar. These were unintentional and we offer our humble apologies for our inadequacies and any inconvenience caused. To the overseas participants, may I wish them a pleasant journey home, and may they take with them pleasant memories of our green campus and of our country – Malaysia.

We bid them "Selamat Jalan," farewell and goodbye. Thank you.

APPENDIX 10

Associate Professor Dr. Khalid Md. Nor,
The Deputy Vice-Chancellor, UPM

Associate Professor Mohd. Shah Hj Lassim
Dean, Faculty of Educational Studies, UPM

Dr. Kamariah Hj Abu Bakar
Chairman, Organizing Working Committee

Ladies and Gentlemen,

In the context of the foreseen activities of this seminar, participants are taken on certain field trips to the Universiti Pertanian Malaysia campus, Tanjung Tuan, Port Dickson and Malacca in order to become familiar with the physical, biological, social and cultural dimensions of the environment of Malaysia. I had the privilege of joining the excursion to Malacca where we saw a tropical rain forest being reserved for the use of the general public. My observation here in Malaysia and elsewhere in many parts of the world convinces me to say that Malaysia still looks like a beautiful garden which must have been taken care of by her careful gardeners. I hope this garden is saved from the future natural and man-made assaults so that it could serve the needs of present and future generations of Malaysia. In particular, our visit to the rain forest Malacca was worthwhile because we saw Malaysia's most important natural resource. We know that Malaysia has been bestowed upon to have a good portion of this precious resource or rain forest of the world which is the home of different species still to be discovered by scientists. It is the depot of raw materials for pharmaceutical research and preparation of different needed medicines of contemporary civilization. In addition, rain forests are the factories or huge natural machines for sustaining the oxygen supply of the planet. It also plays a role in maintaining the regional and global climatic conditions.

The disappearance of tropical rain forests, which is happening at an alarming rate may have adverse effects that could cause extinction of species, could limit man's research and discoveries in the environment, deprive mankind of the abundance of the sources of needed medicine, and may cause climatic changes with unpredictable consequences, particularly for the future generations. Thus, knowledge about tropical rain forests, their place and role in the total environment, man's dependence on it, its care and rationale use and management is an important domain of knowledge to be processed for incorporation into the curriculum for students, teachers and teaching/learning processes of all types and levels of education which has been the main concern of this seminar which, I believe, has indeed been organized in the most appropriate place which is Malaysia.

Mr. Deputy Vice-Chancellor,

This seminar is one of the three meetings organized in a row by Unesco and Universiti Pertanian Malaysia on the different aspects of environmental education. Unesco is indeed pleased to note that Universiti Pertanian Malaysia has opened it's door to show experiences with experts from the region of science. We look forward for further collaboration at international level to share your experience in environmental education with experts from different regions of the world.

The current seminar which is coming to an end today was well planned through the establishment of a Central Committee and an Organizing Working Committee as well as with the careful selection and involvement of experienced and motivated participants, observers and resource persons from different universities (Universiti Pertanian Malaysia, National University of Malaysia, University of Malaya, Islamic International University, Seri Kota Teachers College) and Ministry of Education and Ministry of Science and Environment. Support personnel and facilities provided were very satisfactory.

Inputs to the seminar were the Unesco documents, and their resumes done by resource persons from Malaysia and Unesco as well as country reports prepared and presented by the participants.

The output of the seminar is in the form of a final report consisting of the six prototype units on environmental education for incorporation into teacher training courses prepared by the participants through group work. Each unit has one or more competencies and the inculcation of which needed contents, teaching strategies, evaluation techniques and procedures which have been identified and elaborated. Two of the above units are developed in the context of primary teacher training while the other four units are developed for secondary science and social science teacher training. These units are based on the documents and country reports presented and the discussions that followed.

Mr. Chairman,
Ladies and gentlemen,

On behalf of Unesco I want to thank Prof. Dato' Dr. Nayan Ariffin for accepting the seminar to be organized on the campus of Universiti Pertanian Malaysia.

Our thanks go to Assoc. Prof. Mohd. Shah, Dean, Faculty of Educational Studies, and his academic staff and support personnel whose hard and efficient work served as backbone for maintaining the seminar to reach it's fruitful conclusion. I want to thank the participants and observers for their serious and productive work which has led to the production of the six units referred to earlier.

Mr. Deputy Viced-Chancellor,

Please convey our thanks to the Chief Ministers and State Education Directors of Negeri Sembilan and Malacca for their generous hospitality during the visit of the members of the seminar on 19 and 20 November 1987 in their respective states. We shall take to the different parts of Asia the good memories of the beautiful environment shown to us and the sincere friendship and hospitality accorded to us during our visit to Universiti Pertanian Malaysia, Negeri Sembilan and Malacca.

In conclusion I should like to add that the seminar has succeeded in achieving its immediate objectives through the concerted efforts of the organizers, participants, observers, resource persons, the chairman, Vice-Chairman, rapporteurs of the seminar. Unesco hopes that the achievements of the seminar could lead to concrete actions in the incorporation of environmental education into teacher education and renewed education at the national level in the states.

APPENDIX 11.

ADDRESS BY DATO' DR. NAYAN BIN ARIFFIN, VICE-CHANCELLOR
UNIVERSITI PERTANIAN MALAYSIA AT THE CLOSING OF THE SUB-
REGIONAL SEMINAR ON 'TEACHER TRAINING IN ENVIRONMENTAL
EDUCATION FOR ASIA' AT UNIVERSITI PERTANIAN MALAYSIA ON
SATURDAY 21ST NOVEMBER, 1987 AT 3.30 P.M.

I would like to thank the Organizing Committee for inviting me to say a few words at the closing ceremony of the seminar on "Teacher Training in Environmental Education for Asia". We have been honoured to host this gathering on Environmental Education. Universiti Pertanian Malaysia first hosted a Workshop on Non-Formal Environmental Education in 1985; and we are happy that UNESCO has once again given us the privilege to host the Sub-regional Seminar on Teacher Training in Environmental Education for Asia as a follow up of the previous workshop. The University has always been interested on current issues in Environmental Education and has always been keen to contribute to the development of an environment-conscious society, be it through formal or non-formal means.

I wish to express my sincere appreciation to the Organizing Committee, the module presenters, and all parties who have contributed to the success of this seminar.

Ladies and Gentlemen,

In the past week, you have had the opportunity to study and deliberate on various aspects of Environmental Education, with particular attention to the strategies in curricular development and teacher training. You would have also been exposed to the proposed contents of a series of pre-service and in-service teacher training modules and discussed efficient ways of adapting them to your local needs. This seminar has perhaps helped you to identify documents and activities in teacher training in Environmental Education which is to be developed by the International Environmental Education Programme (IEEP) at the sub-regional, regional and international levels. Hopefully the seminar has provided the impetus for further study in the field of Environmental Education.

The time has come for educationists in Asia to play an important role in the conservation of the environment by inculcating positive values and attitudes among school children. Although the initial task of instilling these values would be the responsibility of the science teachers, environmental conservation should be the concern for all teachers. It may be too demanding to include Environmental Studies as a subject in the school curriculum to deal specifically with environmental

issues, an alternate approach would be to integrate these issues in other academic or co-curricular activities.

Our long term objectives should be to create environmental awareness in our societies which would result in a positive attitude towards preserving the rich heritage intrinsic in our environment.

This Seminar has given you, Ladies and Gentlemen, the opportunity to exchange ideas and views for the implementation of Environmental Education. These ideas and views should be realised in a effective curriculum and in meaningful teacher in the classroom. You will face a lot of challenges in terms of resources, both financial and human. These will, in turn, affect your attempts to inculcate positive attitudes and values in your students and society at large. A concerted effort on the part of world bodies, governments of the various participating countries, Ministers of Education, otgher concerned institutions and the public is called for to ensure the success of the implementation of Environmental Education in schools.

I hope that during your week's stay you were able to see part of our campus. And those who were able to tour Kuala Lumpur, Melaka and Port Dickson, had an enjoyable and relaxing time. I wish you a pleasant trip home and I hope that your visit to Malaysia will urge you to visit us again soon.

Ladies and Gentlemen,

We have come to the end of the Seminar. I hope it has inspired us to redouble our efforts to promote the growth and development of Environmental Education, mainly through proper teacher-training strategies and the meaningful implementation of Environmental programmes in schools.

The future of our planet as an environmentally safe and pleasant habitat is reward enough to make it worth our efforts. With great optimism for the success of Environmental Education and with great pleasure, I declare this Seminar closed.

Thank you.

APPENDIX 12.

ENVIRONMENTAL EDUCATION : MODULE FOR PRESERVICE TRAINING OF TEACHER AND SUPERVISORS FOR PRIMARY SCHOOL - EE NO. 5

Under the chairmanship of Mr. N. S. R. De Silva (Sri Lanka), the document entitled "Environmental Education : Module for Per-service Training of Teachers" was presented by Mr. Mokhtar Hj. Nawawi of the Faculty of Educational Studies of Universiti Pertanian Malaysia. Highlights of the presentation and discussion are as follows:

The module focuses on the pre-service training of teachers and supervisors for the teaching of environmental education in the primary level. The content of this module is considered minimum knowledge for the student teacher who will be teaching environmental education.

The main objectives of the module are to :

1. Foster the acquisition and the transfer of knowledge, skills, and affective attributes concerning the environment and its problems;
2. Develop competence in the teaching and supervision of the environmental dimension in primary schools.

The history of environmental education was traced from the first call of alarm by ecologists in the developed nations concerning pollution, through the Stockholm Conference on the Human Environment in 1972, the Belgrade Conference in 1975 which produced the framework and guiding principles for environmental education, and the regional meetings on environmental education in Africa, Asia, the Arab States, Latin America and Europe.

The underlying philosophy and goal of environmental education, according to the module is the development of world citizens possessing the following characteristics: self-discipline, global outlook, wholeness of self (oneness and interdependence of man and the environment), ability to examine the political and economic-measures that support cooperation rather than conflict, and the willingness and capability to plan and implement action to improve the environment.

To teach/supervise environmental education in the primary school effectively, the teacher trainee should have a thorough knowledge of the environment, its biophysical components, ecosystem dynamics, cycles of nutrients, homeostasis of

biological system, ecological succession, population dynamics cycles of nutrients, homeostasis of biological system, ecological succession, population dynamics, and the flow of energy and nutrients through biological systems. The teacher trainee should also have a good understanding of the socio-cultural components of the environment and the interactions between the biophysical and the socio-cultural components.

The pre-service training would also require a good grasp of the diverse problems that arise from interactions in the environment. These problems could be naturally occurring such as earthquakes, volcanic eruptions, tropical cyclones, and tornadoes, or man induced. Problems brought about by an increasing population demand for food the production of which requires intensification of agriculture through selective breeding, use of chemical fertilizers and pesticides, irrigation, and mechanization have resulted in disease outbreaks, contamination of water supply and soil degradation. Other man-induced problems are those related to water supply, extraction of minerals and energy resources and the utilization of materials and energy.

The environmental problems demand solutions, if man is to exist long on this earth. The solutions require basically a change of attitude by man.

A model or approach to finding solutions to environmental problems consists of the following stages :

1. Preliminary investigation and fact-finding
2. Interpretation and planning
3. Implementation
4. Evaluation

Of much significance to the student teachers are the three strategies for including environmental education in the curriculum. These are:

1. infusion method - the incorporation or integration of environmental concepts into the existing curriculum.
2. applied learning method - applying the knowledge acquired from other disciplines to real life problems.

- 3 holistic method - evaluating the "ecological health" of an environment by comparing it with a mature ecosystem.

Evaluation is a process of determining the degree of desired changes that had taken place. Environmental education, like any other undertaking must be subjected to both formal and informal evaluation.

Discussion after the presentation:

A question arose concerning the content portion of the document, the large number of technical terms, and terms which may be considered college level. The question is : How do you expect primary school children to learn all these terms?

It was explained that the module is a resource text for the teacher educator who will use it for teaching student teachers. In light of this explanation the question was rephrased as follows :

How then do you expect the student teacher to convert it to instruction appropriate to primary children? The response was that the module is to serve as the future teacher's background information. There is, indeed, a need to simplify and adapt the module into teaching materials suitable for primary school children. The concept/content can be translated into activities that are within the life experiences of children.

A participant raised the issue on the emphasis in teaching environmental education. Should it be on content or the translation of environmental education into a way of life? The reply took into consideration the fact that the receiver of pre-service training is the prospective primary teacher. When he/she begins teaching, a syllabus would be provided to serve as a guide. The content is only a means to enable a prospective teacher to teach environmental education as a way of life.

ENVIRONMENTAL EDUCATION: MODULE FOR IN-SERVICE TRAINING OF
TEACHERS AND SUPERVISOR FOR PRIMARY SCHOOLS - EE NO. 6

Under the Chairmanship of Mr. N.S.R. De Silva (Sri Lanka), the document entitled Environmental Education: Module for In-Service Training of Teachers and Supervision for Primary Schools was presented by Dr. Siti Hawa Ahmad, Curriculum Development Centre, Ministry of Education Malaysia. Highlights of the presentation and discussion are as follows:

The module focuses on the in-service training of teachers and supervisors in environmental education for primary schools. It aims at fostering the acquisition and transfer of knowledge, skills, and affective attributes concerning the environment and its problems, and to develop competence in the teaching and supervision of environmental education in primary schools. The emphasis is to increase awareness and sensitivity towards the environment and its problems.

Two alternative modes of implementation of the module were:

1. to make funds available to states for running in-service courses,
2. to infuse the content/approach/methodology of this module into the States' own programmes of in-service training at the primary level.

A discussion of human's actions resulting in the overall ecological/environmental crises and the need to realise our responsibility towards the environment follows. Different orientations or approaches such as education for, of and about the environment will definitely help individuals realise their responsibility, not only towards their fellow beings, but also towards the total environment. The primary school age is very sensitive stage for learning and forming attitudes.

Primary school teachers also need background information on the history of environmental education, the evolvement of the philosophy, goals, general objectives, and guiding principles of environmental education from a series of international conferences. Based on these, the schools are expected to design and develop environmental education programmes, both formal and nonformal. Criteria for the selection of teacher trainees were spelled out for possible adoption in teacher training programmes.

The recommended essential knowledge for teacher trainees in environmental education in-service training programmes may be divided into:

1. environment, its components, matter and energy in it, and interaction among components and processes;
2. pathways of matter and flow of energy consisting of the nutrient cycles and the transfer of energy and matter through various food chains and food webs and the role of man in these changes;
3. ecological system and the impact of man.

It is not enough for an environmental education teacher to be knowledgeable about the environment. The teacher must also have a thorough knowledge of environmental problems brought about by man's activities and the limitations of its resources. The in-service trainee is encouraged to consider alternative solutions to these problems, particularly those concerning resource depletion, population explosion, transfer of technology.

Several teaching strategies are made available to the in-service trainee: inquiry, problem-solving, simulation and gaining, beyond the school experiences (field activity), case study. Examples of environmental activities employing these strategies are contained in the module. The teacher trainee is encouraged to devise/design/write up activities similar to those presented in the module.

Evaluation in environmental education teaching are intended to:

1. evaluate a pupil's progress at different stages of teaching,
2. diagnose a pupil's difficulties in learning,
3. serve as a mechanism for improving teaching.

Evaluation should match the unique characteristics of environmental education, namely interdisciplinarity, focus on problem-solving, action-orientation, and focus on values and attitudes.

QUESTION AND ANSWER SESSION

The first question was why the content of EE No.6 (In-service Training of Teachers and Supervisors for Primary School) is very similar to EE No.5 (Pre-service Training of Teachers and Supervisors to Primary Schools). The response was that, although

the basic environmental concepts are the same, the technique of dealing with the target group was basically different. In the pre-service training the student teacher as an end product has to be motivated. In the in-service training, the teacher trainee, experienced as he/she is in teaching, still needs a whole range of knowledge on the topics in environmental education as well as a re-orientation to the known subject matter in order to re-direct it towards conservation and enhancement of the environment.

It was also noted that the provision of a continuous reeducation (in-service courses) in terms of the body of knowledge, for example, in environmental education, can become repetitions and, therefore, boring. The response was that the core content of the in-service training curriculum was specifically intended to increase knowledge in breadth and depth. It is essential for those responsible for the training to conduct an assessment of the knowledge possessed by the teacher trainees at the beginning of the training period. It is also true that what may be needed is not knowledge and strategies of presenting them, strategies of classroom management, and strategies of dealing with students on an interpersonal basis.

The Indonesian experience with the Open University System of making provisions for the re-training of teachers to further their knowledge was described. The same or similar system of re-training or in-service training may be applied to environmental education. The main problem encountered in this system was the training of teachers who already had five years or more of teaching experience. It was difficult to break old habits or to give up old irrelevant knowledge in light of new curricula.

Sri Lanka also faced the same problem of re-training teachers. The Curriculum Development Centre has taken on the responsibility for the formulation and implementation of an in-service training programme.

Malaysia's categories of in-service training courses into introductory, refresher, and extension courses were mentioned. However, even environmental education had already been introduced as an elective course in a teacher training institute.

There was a question on differentiated treatment in the in-service training of those trained in different disciplines. Is this advisable? The answer was that it was imperative to delineate certain key disciplines to allow the incorporation of environmental concepts in each one accordingly. It was emphasized that the approach to environmental education is interdisciplinary.

One participant suggested that the planning of the environmental education curriculum be made by a team of lecturers from different disciplines. Such an effort had been successfully made in an in-service course on communication skills. It can prove successful in environmental education as well. This suggestion was considered by other participants as difficult to implement.

Should there be priority in the use of EE No.5 or EE No.6? It was elaborated that each module has a different target group and different implementation requirements for serving objectives. Thus, priority should be based on the needs of particular situations with due consideration given to its adaptation for relevance.

MODULE FOR PRE-SERVICE TRAINING OF SCIENCE TEACHERS AND
SUPERVISORS FOR SECONDARY SCHOOL - EE NO 7

Under the Chairmanship of Mr. Nagendralingan the document entitled 'Module For Pre-Service Training of Science Teachers and Supervisors For Secondary Schools' was presented at the seminar by Dr. Ahmad Badri Muhammad.

Highlights of the presentation and discussion are as follows. The session commenced with the showing of slides that contrasted beautiful and clean environment with dirty and poorly managed environment with the purpose of impressing upon the audience the importance of establishing values in environmental education.

The resume of Environmental Education No. 7 : Module for Pre-Service Training of Science Teachers and Supervisors for Secondary was subsequently presented. Attention was called to the five objectives of the module which are:

1. to develop a sense of urgency concerning environmental crisis and the need for environmental education;
2. to trace the origins and define the characteristics of environmental education;
3. to establish the relationship between science teaching and environmental education;
4. to promote problem solving as the central feature of environmental education;
5. to acquire skills in curriculum planning teaching strategies, and methods of evaluation appropriate to environmental education.

In Chapter 1, the need for pre-service science teachers to be informed about the nature of environmental issues, environmental challenge to education, the need to define environmental education, and the relationship of environmental education to science was elaborated on.

The pre-service teacher educators were asked to:

1. be aware of environmental situations that have educational potential;
2. identify educational issues;
3. be enthusiastic about environmental issues;
4. be assured of availability of resources in teaching;
5. familiarize students with the aims of environmental education;

6. be able to relate general aims to specific educational tasks;
7. reinforce the knowledge students have about science teaching;
8. be aware of different purposes for environmental education.

The relationship between environmental education, science education, technology and society was highlighted. Science and environmental studies use the same basic skills:

observing, classifying, formulating and suggesting hypotheses, and designing experiments.

The reiteration of the three important requirements of the pre-service training of science and environmental education teachers was made: (1) commitment, (2) motivation, (3) method. These three requirements play important roles in teacher decisions on what environmental concepts should go into which part of science teaching. This is a curriculum task for the teacher that is of utmost importance.

Environmental problems of local, national and global scope must be known to the pre-service teacher educator to convincingly lead the pre-service teachers to carry out investigations and propose solutions to real environmental problems. A case study technique is suggested for the accomplishment of this task.

Attention was called to the teaching strategies most suitable for infusing environmental concepts in science. Suggestions in the module are games, simulations, field trips, and outdoor study.

The pre-service teacher educator is faced with the question: How is environmental education to be evaluated? From the module the following reminder was obtained: assess the societal aspects of science and environmental learnings in addition to the cognitive content. Test instruments for this purpose may take the form of agree-disagree statements, fill-in the blanks, preference marking, hypothetical actions on a given problems, and learner reactions to slides depicting environmental issues.

Four phases for the successful implementation need to be stressed: recognition, identification, responsibility for overcoming constraints, and the maintenance of implementation activities.

Question and Answer Session

A comment came up concerning the time and safety constraints that prevent teachers from taking the class on excursions. Opinion was sought on the use of the school grounds for environmental education activities. The general response of the group was to

endorse the necessity for the pre-service teacher educator to hold environmental activities in the school compound. However, the value of field trips to real environmental settings is immeasurable. Field trips can be planned for pre-service student teachers to nearby places of interest, even as a Saturday afternoon excursion.

A particular recommended highlighting the need for opening the heart and then the mind approach. The user of this approach, however, is faced with the difficulty of selecting the most suitable strategies for it. The motivation and commitment of the teacher himself should be the starting points. If the teacher has no interest in the activities, the students will suffer from low morale due to lack of teacher support. For the teacher to be stimulating, motivating, he/she must do extra reading and preparation.

It was noted that much importance was given to the development of teacher confidence in teacher training. Mastery of the subject matter is a way of building confidence. Confidence can also be acquired through religious awareness, civic consciousness, peer/professional group interaction and also social skills such as verbal and interpersonal skills.

ENVIRONMENTAL EDUCATION: MODULE FOR IN-SERVICE TRAINING OF
SCIENCE TEACHERS AND SUPERVISORS FOR SECONDARY SCHOOLS -
EE NO. 8

Under the chairmanship of Mr. Nazendralingan Ratnavadivel (Malaysia), the document entitled Environmental Education: Module for In-Service Training of Science Teachers and Supervisors for Secondary School was presented at the Seminar by Miss Indra Somasundram of Seri Kota Teachers College. Highlights of the presentation and discussion are as follows:

REPORT ON ENVIRONMENTAL EDUCATION MODULE NO. 8

Presented by Miss Indra Somundram

The session commenced by highlighting the title of the Module. The presenter expressed a preference for in-service education rather than in-service training as the emphasis was on the cultivation of values.

The module provides a comprehensive coverage of the various dimensions of environmental education for secondary school level science teacher and supervisors. The dimensions are:

1. objectives of the in-service education
2. the history and philosophy of environmental education
3. basic knowledge of environmental concepts and environmental concepts and environmental issues
4. teaching-learning strategies in environmental education
5. activities for the teaching-learning of environmental education
6. evaluation in environmental education
7. strategies for the implementation of environmental education

It was also mentioned that the module contained appendices to a number of aspects pertinent to environmental education. These include the following:

1. an environmental education syllabus
2. a summary of the Stockholm Conference on the Human Environment
3. declaration of the Tbilisi Intergovernmental International Environmental Education Programme.

The module also focuses on the implementation requirements of the in-service programme, namely,

1. preparation of a course curriculum/syllabus
2. criteria for selection of the participants
3. preparation of schedule of activities
4. budget estimates
5. preparation of lesson plans
6. the formation of evaluation instruments

The key focus of the module as indicated in the general objective, is on competence. In the teaching-learning strategies in environmental education dimension, the key to this competence is the ability to module students in active student participation. Mentioned strategies like problem solving, experimental investigation, survey method, case study, role-play and games and simulation.

The presenter then made a few points regarding the utilization of the module. The module is a teacher/teacher educator resource and not a syllabus. The module is to be used as a basis for developing teaching-learning units on local science-related environmental issues.

The presenter then gave the modes and levels of in-service education.

Solution	4						x
Study	3				x	x	x
Awareness	2		x	x	x	x	x
Information Discussion	1	x	x	x	x	x	x
-----+-----+-----+-----+-----+-----+-----							
		Bulletin	Conference		Consultancy		
		Query		Course		Workshop	

The presenter then went on to suggest what could be done during the workshop. These were:

DEVELOPING TEACHING-LEARNING UNITS

1. Identify local environmental issue/problems that are science related
2. Locate the plug in point in science curriculum

3. provide conceptual map of the relevant scientific and environmental concepts involved
4. Develop the teaching-learning strategies and activities appropriate for the teaching-learning of environmental problems

QUESTION AND ANSWER SESSION

A member commented on a statement made by the presenter 'values caught rather than taught'. He called attention to posters which highlight legislation with regards to environmental conservation. He said that most people are aware of the environment only when they are fined, adding that maybe that legislation could be added to the content of in-service module.

The presenter agreed with the suggestion, and other members of the floor also mentioned that they were of the same view. Environmental legislation, according to one participant, can be seen in two levels: one, is the complain of citizens to draw which are being enforced, two, is the loklying or working for an environmental law that is not in exestenice but is much needed. But certainly this is a dimension of envionmental education that should merit enclusion in the curriculum.

The question why economic considerations in Environmental education have not been included in the module or other participant volunteered the information that the extertnalities and the damage to the environment by actions for economic development can be considerable and certainly the economics of the environment is important.

One participant noted the claim for interdisciplinary approach in this module which is science-based. He felt there is a conflict or inconsistency in it. The presenter explained that in science problem-solving can be approach, viewed and solved by drawing from many disciplines, and in this sense it is interdisiplinary.

To provide the science teacher trainee with a solid background in environmental education, an in-service training programme should include an extensive discussion of the history and philosophy of environmental education. The history of environmental education is traced back to the Stockholm Conference in 1972 to the Belgrade Workshop in 1975 to the Ibilisi Conference in 1977, the international conference which yielded such documents as the declaration on the Human Environment, the Belgrade Charter, and the declaration on Environmental Education, respectively. It is from these documents that the philosophy, goals and guiding principles of environmental education were drawn.

A science teacher trainee must also have a mastery of the essential knowledge about the environment. This essential knowledge including the ecosystem, the concept of limiting factors, energy flow in the earth ecosystem, materials flow which refers to the water cycle, the gas cycle, and the rock cycle. Population dynamics, the effects of human intervention in the natural processes the human ecosystem and the causes and consequences of major environmental problems would complete the essential knowledge required of a science teacher trainee who finishes the in-service training in environmental education.

ENVIRONMENTAL EDUCATION: MODULE FOR PRE-SERVICE TRAINING OF
SOCIAL SCIENCE TEACHERS AND SUPERVISORS FOR SECONDARY SCHOOLS -
EE No. 9

Under the chairmanship of Mr. N.S.R. De Silva (Sri Lanka), this module presented by Assoc. Prof. Lily Chew of Education Faculty, University of Malaya, Malaysia.

The ten objectives listed of the module were condensed as follows:

1. To acquaint pre-service teachers and supervisors in social science with some essential knowledge about the environment and problem-solving approaches in environmental education.
2. To familiarize them with the planning, conduct, and evaluation of the environmental dimension of secondary school social science subjects.

The various sections of the module were further highlighted. They are:

1. the rationale for incorporating environmental education for pre-service training of secondary-school social science teachers and supervisors, which includes the sub-topics on history and philosophy of environmental education, goals for environmental education, environmental education in the secondary school and the need for pre-service training of secondary school social science teachers and supervisors in environmental education;
2. essential knowledge about the environment for secondary school social science teachers and supervisors;
3. issues related to the problems of the environment and ways and means to overcome them;
4. recommended teaching methodologies;
5. activities and experiments for teaching/learning the environmental dimensions in social science subjects in secondary schools;
6. methods of evaluation in environmental education;
7. some strategies for planning, development, implementation, management and evaluation of the environmental dimensions of secondary school social studies curriculum.

Another issue raised was on the differing concepts found in social studies and environmental education. The question was whether concepts in social science should take precedence over concepts in environmental education or vice versa. It was the view of the presentor that many concepts in social studies incorporate a strong science bases and that concepts of environmental education can be infused into disciplines like history and geography, the later deals with such topics as land use, deforestation, etc. There would be no difficulty in infusing concepts in environmental science into social science. Some social science subjects are more conducive than other to the infusion of environmental education. More awareness of the environment could be infused through vicarious experience through description and reports done.

The next question touched on the possibility of overloading the social science curriculum in view of the infusion of environmental education. The response was that it was mainly the approach that was important and emphasis should not be given on content per se. It was further added that overloading of content did not arise in the Malaysian situation where student teachers go through a basic science education in school. The infusion of EE concepts into the subject moral education is evident in the layman's knowledge. Further clarification was sought on the term 'layman's knowledge'. The term usually means the use of general terms that are readily identifiable by students.

It was brought out in the discussion that a study on the use of geographical skills involving recording, observing and integrating data in Malaysian schools revealed that teachers had problems in generalization. It was felt that the problem was due to the lack of science-based explanation and is indicative of the compartmentalization of the disciplines. Another example of this inability to relate environmental awareness to social issues was the case of a beautiful school compound and the presence of a strong stench from a nearby monsoon drain.

Another question was how to impart environmental education to gardeners. In reply to the various issues posed it was reiterated that essential knowledge of science is found in the content of social science or social studies subjects. It was felt that science and non-science approaches need not be isolated in tackling environmental issues. In fact, regardless of whether the teacher is trained in science or social science, the teacher finally has to be a person who cares enough about the environment. As to the education of the gardener, non-formal aspects like exposure to environmental consciousness and efforts by the headmaster to improve his environmental awareness could be looked into. The main point is to instill moral obligation rather than focus on content.

A distinction between the term 'social science' and the term 'social studies' was made as this would influence the designing of the curriculum content.

In The Structure of the Social Studies (1964), Scriven defines social studies as a selection from the social science, together with a good deal of data from everyday experience. Social science as a study with concepts from history, geography, psychology, economics (including business principles), anthropology, government or political science (including civics), problems of democracy, ethnics, logic, social studies (studies of man's social behaviour). To the above list, the presenter also added art, music, moral education and religion.

Thus a social studies curriculum can incorporate:

1. a available body of knowledge
2. relevant knowledge to meet the needs of society and the individual
3. knowledge in a form suitable for pupils to understand.

The presentation ended with a note that pre-service social science teachers lack resources and knowledge in problem-solving approaches in talking environmental issues.

Discussion after the presentation:

A question raised was whether religious education, particularly the teaching of Islam could play a part in developing environmental values. It was the opinion of several participants that religion plays a very important part in inculcating values. It was elaborated that in Malaysia, courses in Islamic education at the tertiary level are offered at the International Islamic University and in the Academy of Islamic Studies in University of Malaya. The UNESCO representative added that the institute of Environmental Science & Resource in Egypt had developed a program for "imams" whereby materials were prepared for teaching and relating religion with environmental awareness. These materials had great potentiality and follow-up studies were planned. In fact, values and beliefs common to all religions could be exploited in enhancing EE programmes. The teaching of values and beliefs should not merely be content-based but also problem-solving skills-based. In using the problem-solving approach on environmental issues content could be the basis for resolving them.

ENVIRONMENTAL EDUCATION : MODULE FOR IN-SERVICE TRAINING OF
SOCIAL SCIENCE TEACHERS AND SUPERVISOR FOR SECONDARY SCHOOLS -
EE NO. 10

Under the chairmanship of Mr. N.S.R. De Silva (Sri Lanka), the document entitled Environmental Education: Module for In-Service Training of Social Scienced Teachers and Supervisor for Secondary Schools was presented by Assoc. Prof. Dr. Thilla Chelliah, University of Malaya. Highlights of the presentation and discussion are as follows :-

As an introduction it was pointed out that Social Science teachers already use materials related to environment and hence this could provide possibilities for infusion of the environmental dimension not as mass content but as a new perception of relationships and acquisition of new values within the social science context.

The in-service training for social science teachers and supervisor should aim at (i) developing responsible behavior towards the environment, and (ii) helping young people to acquire suitable attitudes and values which still make citizens more self-disciplined, self-reliant and who will understand their place in nature.

The skills necessary for social science teachers are (i) the methods of problem-solving, (ii) values of clarification, and (iii) selection ;and use of relevant material.

The Objective of Module No. 10 On The In-Service Training of Secondary Social Science Teachers and Supervisors In Environmental Education.

To develop competence in teaching and supervision of the environmental dimension of social scienced in the secondary school.

The content of the module include :

1. What Environmental Education is about
2. Essential knowledge about the environment for secondary school, social acienced teachers and supervisors.

This cahpter explains the concept of the "environment" and than treat as a basic level the influence of mankind in the four

spheres that comprise the environment ie. the Atmosphere, the Hydrosphere, the Lithosphere and the Biosphere.

3. Essential knowledge about environmental problem of environment and means and ways for their solution and prevention.
4. Teaching methodologies in environmental education with special emphasis on problem solving approaches.
5. Evaluation in environment education.
6. Suggested experiments and activities to facilitate the teaching and learning of environmental education dimension of secondary school social science subjects.
7. Strategies for planning, development, implementation, management and evaluation of the environmental dimension of secondary school social science curriculum.

It was suggested that infusion be used as a new perspective in methodology as well as in content. The concept that the environment consist of the biophysical and socio-cultural aspects which are interrelated and interdependent parts of a complex web. It is also necessary for teacher trainees to understand the four spheres, atmosphere, hydrosphere, lithosphere and biosphere in order to upgrade their information and knowledge base in environment education.

In the discussion that followed the presentation, it was stressed that in teaching and learning of environmental education it is the attitudes and values that are more important than content. To further emphasize the important of values. The presenter narrated her experience in teaching environmental education as an optional subject to some Islamic student who approached the subject with diffidence. Knowing the need of water for cleansing purposes before prayers, she took that as her entry point. What is clean water? What is polluted water? What are the agents that pollute water and so on. Very soon the students were dealing with activities aimed at value clarification.

This demonstrates the relationships between a religious requirement (ablution) and the environment. It was pointed out that it is necessary to design methodology which would emphasize activities rather than content. In other words the emphasis is on action learning or learning by doing rather than through

books. However it was said that the teacher should highlight important information. Such method would rely less on technical jargon. This is on the assumption that students are already equipped with information about the environment through media coverage. With this form of general knowledge, students can launch into activities.

It was also pointed out that since environmental education needed time for classroom activities as well, the time constraint creates problem in teaching. What is considered minimum environmental education content for teaching in an in-service training programme? The answer was that the subject matter of environmental education depends on the environment knowledge, information exposure of the teacher trainees and the conditions of the locality and country concerned.

It was explained that students may have different levels of understanding the environment. However, there has been enough media coverage on environmental issues, (e.g. pollution through acid rain in Kelang valley, Malaysia). It can be conducted that all students should have basic understanding of the environment. It was further added that, one way of making students aware of what they know is through questions on how to include environmental education into the curriculum and what they would consider a suitable subject for infusion of environmental education.

The students' responses are then analyzed. Based on this information, their understanding are discussed. This form of general knowledge is the take off point to deeper understanding of the environment. For example, the topic clean water can be developed further to include the effects of dams in an ecosystem. It was also pointed out that environmental education could be infused even in laboratory situations. When students handle apparatus teachers could seize these opportunities to explain why such materials could be environmental hazards. For example, when discussing electricity and dynamo, teachers could lead discussions on building hydroelectric dams. When using acids teachers could talk about how to safely dispose off such toxic materials. Laboratory safety has been incorporated into a course at the Teacher Training level in the University Malaya. This unit entails discussions on safety measures and proper handling of toxic and lethal materials. During teaching practise trainee teachers are required to include activities that would lead the class to discuss why such information is important to their lives.

It was suggested that since certain concepts of environmental education are already included in the curriculum of

Social Science, rather than infusion of environmental education concepts into the curriculum alone it would be a far better idea to infuse also through methodology. This would make implementation easier as well as solve man-power financial problems in implementation etc. The teacher trainee takes the responsibility to learn the relevant environmental concepts while doing the activity.

APPENDIX 13

STRATEGIES FOR THE TRAINING OF TEACHERS IN ENVIRONMENTAL EDUCATION (EE-25)

Resumé by Dr. Abdul Ghafoor Ghaznavi, UNESCO, Paris

Introduction

The document entitled *Strategies for the Training of Teachers in Environmental Education* was prepared under the UNESCO-UNEP International Environmental Education Programme (IEEP) by Richard J. Wilke, R. Ben Peyton and Harold R. Hungerford with the purpose to assist interested persons and institutions in developing strategies for incorporating environmental education (EE) into the content and teaching methods of pre-service and in-service teacher training programmes. In view of the diversity of the levels and types of teacher training the document's major achievement is the recommendation of processes for developing strategies and training programmes whose application, with necessary modifications, could be considered in the context of different teacher education systems.

The document has four chapters. Chapter I is the introduction, Chapter II elaborates Current Teacher Education Efforts and Programmes in Environmental Education, Chapter III is on Strategies for the Training of Teachers in EE and Chapter IV is the Summary/Conclusion which is followed by a rather extensive bibliography.

Current Teacher Education Efforts and Programmes in Environmental Education

Although the Tbilisi Conference on Environmental Education (1977) recommends that the environmental dimension permeate all areas of the school curriculum, this will not happen unless teachers develop the competencies to make it happen. In this context the goal of any teacher education effort or programme in EE should be to develop environmental education competencies with respect to knowledge, behaviours, and skills which are necessary to effectively incorporate the environmental dimension in educational programmes.

Pre-service Teacher Training Programmes

Within some states and/or nations, pre-service training in EE is required for teacher certification. Although these requirements are encouraging, in most cases the scope of EE training required has not been sufficiently broad. With few exceptions, the training provided in ecology or conservation for pre-service teachers has not been adequate to develop the gamut or series of competencies needed to infuse the environmental dimension into their teaching. Pre-service training requirements in EE for a few states and nations are also described in the document. In Wisconsin (USA) the statutes require adequate instruction in the conservation of natural resources for teacher certification in all elementary and some secondary areas.

In Colombia, a fundamental aspect of the national education system has been a programme prepared by the Ministry of Education's Directorate General for Training which ensures the EE training of all teachers.

In Bulgaria, training in ecology has become a requirement for the qualification of teachers and instructors, particularly in chemistry and biology and in other sciences with links to environment.

In the USSR, the Ministry of Education has made a course on nature conservation compulsory for all teachers in training. Pre-service teachers take this course during third year of training. Since 1970-71 academic year, a 30 hour nature conservancy course has been included in the curricula of all 200 pedagogical institutions in the Soviet Union.

In Thailand, the curricula of all teacher colleges include two courses on ecology and on conservation of natural resources. At the Chiangmai University, the Faculty of Education has organised an interdisciplinary team teaching training programme for pre-service teachers. Students take courses related to EE in different faculties of the University, such as the faculties of science, agriculture, etc.

In Indonesia, four national teacher training institutes have infused EE in population education courses. These courses are required for both students of science and humanities. Topics included are impact of population growth on socioeconomic development, land use, water management, the energy problem, conservation of natural resources, public health, nutrition, etc. Since the population courses are interdisciplinary, a team teaching approach is used.

In Malaysia, EE is an optional subject in the Bachelor of Education Programme of the University of Agriculture of Malaysia, and the University of Malaya, Kuala Lumpur, while for students in the School for Educational Studies at University of Malaysia, environment is a major area of study in the course on contemporary educational problems and issues.

Other examples are given in this document from the Netherlands, Cuba, Commonwealth of Dominica and Lebanon.

With the exception of the specialised degree programmes in EE, very few pre-service programmes exist which are designed to develop all the knowledge, behaviours, and skills necessary for pre-service teachers to effectively incorporate the environmental dimension in their teaching.

In-service Teacher Training Programme

The retraining of the many in-service teachers who are now responsible for the education of elementary, secondary, and tertiary students is considered an even larger challenge. In this section, programmes which have been implemented for the purpose of assisting practicing teachers to incorporate the environmental dimension in their teaching are described.

In-service training of teachers can take various forms. The types of EE in-service opportunities provided for Virginia's school personnel are as follows: workshops (35.8%), graduate and continuing education courses (33.5%), staff meetings (28%), conferences (26.1%), staff exchanges (10.6%), institutes (7.3%); released time for staff improvement (5.5%), correspondence courses (0.5%), and others (3.2%). In over 28% of the Virginia schools no in-service was provided in EE.

The United Kingdom's Poulton-le-Fylde College of Education offers a one year programme for teachers of the 9-13 age group. The programme stresses the nature of environmental change, methods of involving students and teachers in local community environmental resources for schools.

Member colleges of the Liverpool Area Training Organisation also offer a programme aimed at teachers of students age 9-13. The two year, part-time programme is offered to teachers with one year of experience. Graduates receive a Diploma in Environmental Education.

Within the United States of America, a number of universities offer programmes for teachers which lead to a graduate degree in EE. Among the universities offering comprehensive programmes are: The Ohio State University at Columbus, Southern Illinois University at Carbondale, The University of Wisconsin at Stevens Point, Michigan State University at East Lansing, and The University of Michigan at Ann Arbor. At each of these universities, numerous courses and experiences are available for developing all the necessary EE competencies required to incorporate the environmental dimension.

Comprehensive in-service programmes can also be made available through the use of a teacher or teaching centre. A teacher centre is a curriculum development and professional staff support system. Teacher centres have been widely developed in many countries, including Japan, Sweden, the Netherlands, the United Kingdom, Nigeria and the United States. Environmental education can serve as a special focus for a teacher centre.

The use of television and radio media in a large scale EE programme has been one of the most important and effectively projects in Chile. The programme was organised by the Facultad de Ciencias Forestales of Chile in cooperation with the national television channel and the Ministry of Education. Many of the programmes have been directed toward in-service teachers by providing supportive materials for curriculum design and teacher training.

Besides workshops, publications such as journals and newsletters have been used to familiarise in-service teachers with curricular and instructional materials for EE.

Chapter II concludes that in the establishment of a teacher training programme in EE, the goal should be to develop the EE competencies necessary for educators to incorporate the environmental dimension in their teaching. In establishing a programme, careful attention must be paid to local and national conditions.

Strategies for the Training of Teachers in EE

The Need for Teacher Training in EE

The need for teacher training in EE has been documented by responses to a UNESCO questionnaire entitled: "Assessment of Resources for Environmental Education: Needs and Priorities for Member States." The principal conclusion drawn from the survey was that a majority of UNESCO Member States (71%) have (according to the scale of measurement used in the study) very high needs in EE. Perhaps, the most intense of these needs at the world level concerned the training of personnel for educational activities (81% of the countries). The need for teaching personnel with training in EE was apparent across both geographical regions and educational levels (preschool, primary, secondary and tertiary).

The most significant event leading to worldwide recognition of the need for teacher training in EE was the first Intergovernmental Conference on EE convened by UNESCO during October 1977 in Tbilisi, USSR. The Final Report from the Tbilisi Conference stated that "the training of qualified personnel was considered to be a priority activity. This holds good for both initial and in-service training for the purpose of familiarising teachers in formal education, organisers in non-formal activities for young people and adults, administrative personnel and educational planners and researchers with environment-linked subject matter and educational and methodological guidelines."

In order to secure the implementation of the Tbilisi Conference recommendations it will be necessary to convince educational policy makers, educational planners, and faculty from teacher education institutions that there is a great need for pre-service and in-service training of teachers in EE because without their support the implementation of successful teacher training programmes in EE will be a very slow process.

Competencies Required of an Effective Environmental Educator

The initial steps in designing training programmes at either pre- or in-service levels must include a definition of the desired teacher product. The most functional way to define the product is in the form of expected behavioral competencies — associated knowledge, skills, and attitudes — which are necessary in order to effectively teach environmental education (EE) programmes. The document has identified 27 competencies which are listed here.

1. Foundational Competencies in Professional Education. The effective EE teacher should be able to:

- a. apply a knowledge of educational philosophy to the selection (and/or development) of curricular programmes and strategies to achieve both general education and EE goals.
- b. utilise current theories of moral reasoning in selecting, developing and/or implementing EE curricula which will effectively achieve accepted goals of EE with selected receiver groups.
- c. utilise current theories of knowledge/attitude/behaviour relationships in selecting, developing and/or implementing a balanced curriculum which maximizes the probability of desired behavior changes in receivers.
- d. utilise current theories of learning (e.g. Piaget, Bruner or Gagne) in selecting, developing, and/or implementing curricular materials and teaching strategies to effectively achieve EE goals with selected receiver groups.
- e. apply the theory of transfer of learning in selecting, developing or implementing curricular materials and strategies to insure that learned knowledge, attitudes, and cognitive skills will be transferred to life style decision-making by receivers.
- f. select effective instructional methodologies which are appropriate for desired cognitive and affective outcomes, receiver characteristics, and available facilities (e.g. time, money, personnel).
- g. effectively implement the following methodologies to achieve EE goals:
 - (i) outdoor education methods.
 - (ii) effective education methods (e.g. values clarification, Bank's inquiry model, moral dilemma model).
 - (iii) simulation games (including role playing).
 - (iv) case study methods.
 - (v) community resource use (ecological, issue related, human resources).
 - (vi) methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues.
 - (vii) appropriate teacher behaviours while handling controversial environmental issues.

- (viii) develop and use effective means of planning for instruction.
- (ix) effectively infuse appropriate EE curricula and methods into all disciplines to which the teacher is assigned.
- (x) effectively evaluate EE curricula and methods achievements with receivers in both cognitive and affective domains.

2. Competencies in Environmental Education Content

Level I: Ecological Foundations

The effective EE teacher should be able to:

- (xi) apply a knowledge of ecological foundations to the analysis of environmental issues and identify key ecological principles involved.
- (xii) apply a knowledge of ecological foundations to predict the ecological consequences of alternative solutions to environmental problems.
- (xiii) be sufficiently literate in ecology to identify, select, and interpret appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental problems.
- (xiv) communicate and apply in an educational context, the major concepts in ecology.

Level II: Conceptual Awareness

The effective EE teacher should be able to select, develop and/or implement curricular materials which will effectively make receivers aware of:

- (xv) how man's cultural activities (e.g. religious, economic, political, social, etc.) influence the environment from an ecological perspective.
- (xvi) how individual behaviours impact on the environment from an ecological and cultural perspective.
- (xvii) a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues.
- (xviii) the viable alternative solutions available for remediating discrete environmental issues and the ecological and cultural implications of these alternative solutions.
- (xix) the need for environmental issue investigation and evaluation as a prerequisite to sound decision making.
- (xx) the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making.

- (xxi) the need for responsible citizenship action (e.g. persuasion, consumerism, legal action, political action, ecomanagement) in the remediation of environmental issues.

Level III: Investigation and Evaluation

The effective EE teacher should be competent to investigate environmental issues and evaluate alternative solutions and to develop, select and/or implement curricular materials and strategies which will develop similar competencies in receivers, including:

- (xxii) the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information and to synthesize the data gathered).
- (xxiii) the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications.
- (xxiv) the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions.
- (xxv) the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications.
- (xxvi) the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions.
- (xxvii) the ability to evaluate, clarify, and change their own value positions in light of new information.

Level IV: Environmental Action Skills

The effective EE teacher should be competent to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and the quality of environment, and to develop, select, and/or implement curricular materials and strategies to develop similar competencies in receivers to take individual or group action when appropriate (i.e. persuasion, consumerism, political action, legal action, ecomanagement, or combinations of these action categories).

A Process for Curriculum Development in Teacher Training Programmes

The document outlines a process of curriculum development applied to typical teacher training programmes at elementary and secondary levels.

It is pointed out that pre-service training programmes in EE may involve three approaches: (1) a specific course in EE methods; (2) infusion of EE methods and foundational components into existing programme courses; and (3) addition of courses in the curriculum which deal with foundational components. Ideally, a pre-service training programme would incorporate all three of these approaches.

1. Elementary Education Programme – The initial phase of the EE curriculum development should involve a refinement of the expected EE competencies. The completed list of EE competencies may then be used to analyse the existing curriculum to determine where training in specific competencies is already being achieved. In this phase of curriculum planning, the faculty assigned to teaching the pre-service courses should be involved. These indi-

viduals will have a more intimate knowledge of course content and be more capable of identifying where EE competencies are, or could be taught. Further, their involvement in the process will serve to educate them about the competency goals of EE, need for infusion, and deficiencies in their own backgrounds.

The training programme should be designed in such a way that it could prepare teachers to achieve EE goals in their classrooms. One approach would be to modify those courses evaluated so that they facilitate development of the designated competencies through infusion. A second approach would be to develop a separate methods course to deal directly with these EE competencies. Since time will necessarily limit the effectiveness of either approach, it is more pragmatic to attempt both, some degree of infusion and the development of a separate methods course to supplement the regular programme. Use of both approaches will not only enhance the probability of developing competencies in EE, but the resulting reinforcement and transfer of basic educational competencies should increase the general teaching effectiveness in other disciplines as well.

2. Secondary Education Programme — The same process may be applied to developing EE competencies in pre-service secondary teachers. However, important differences exist between traditional secondary and elementary teacher training programmes. Secondary teachers are generally given considerably more depth in their major and minor areas of emphasis and less training in professional education foundations. There are fewer "core" courses required of secondary education majors, and thus, there is more diversity in course selection.

To overcome this difficulty of diverse course selection, one approach might be for each major area (e.g. biological sciences, social studies, etc.) to analyse its programme for possibilities to infuse EE. While this may theoretically be more desirable, pragmatically it is unlikely that all majors will have the commitment, facilities, and time to effectively "environmentalise" their curriculum. Therefore, addition of environmental education requirements to the curriculum may be necessary to guarantee development of EE competencies in pre-service secondary educators. These courses should be essentially the same as those proposed for the elementary curriculum except that the EE methods course will be based on secondary education methods.

A viable alternative to the EE methods course may be to increase credits and time allowed for the major teaching methods course (e.g. Methods in Science Teaching) and to include a large section which trains pre-service teachers to achieve EE goals in their own discipline. The advantage of this would be possible if all majors were enrolled in the same EE methods course.

Training of EE Specialist

Some emphasis is put on the training of EE coordinators whose role is more one of administrator or curriculum coordinator than the classroom teacher. University training programmes for EE coordinators should be at graduate level, since an EE coordinator must have experience in teaching, and fully maximize skills and knowledge in administration and EE. A graduate programme to train EE coordinators should strive to achieve the same administrative competencies as those identified for any other disciplinary coordinator. In addition, the programme must provide for any EE competencies in which the candidate has a deficiency.

Enormous gains could be made in worldwide environmental education (EE) if the philosophy, content, and spirit of EE could be infused into the existing framework of teacher education programmes. Interestingly, such an infusion could take place without compromising either the quality or goals of existing courses and programmes. In some instances, the quality of programmes could even be upgraded if attention was focused on the higher level processes involved in EE, e.g. issue investigation and evaluation.

One can envision a teacher education programme with environmental content infused into general education courses (i.e. liberal arts courses) such as earth science, biology, chemistry, economics, social problems, music appreciation, religious history, design, basic mathematics, communications, literature, and others. The same holds true for course work specifically designed for teacher education. Environmental content could be infused into a general classroom methods course, the student teaching experience, and special methods courses (e.g. science, math, social studies, language arts, music, industrial arts, and home economics). All of these courses/experiences have elements in them which are eminently appropriate for the environmental content infusion process.

Numerous limiting factors exist which pose serious constraints to the realisation of such an infusion. Among these are the traditional contents and methods utilised by teachers — even at the tertiary level — who tend to teach both what they had been taught and in the manner in which it had been taught to them. Other limiting factors are a lack of administrative interest or power, budgetary constraints, prescribed or dictated curricular thrusts in the student teaching experience, and a lack of environmental commitment among the pre-service teacher population itself.

Methods Courses for Professional Education: Elementary and Secondary

This section outlines a skeleton of a methods course which could help develop competent environmental educators. The course is to serve for elementary and secondary level. The main objective reflected is that receivers must be given skills and competencies to take them beyond awareness to a higher plateau of autonomous citizenship behaviour from the classroom to community living.

The course includes 11 components as follows:

Methods Component	I	— Philosophy
Methods Component	II	— The learner and EE
Methods Component	III	— Curriculum Development in EE
Methods Component	IV	— Curriculum Models
Methods Component	V	— Preparing for Instruction
Methods Component	VI	— Methods of Teaching Awareness
Methods Component	VII	— Methods of Teaching Investigation Skills
Methods Component	VIII	— Methods of Affective Education
Methods Component	IX	— Methods of Teaching Citizenship Action Skills
Methods Component	X	— Resource Utilization
Methods Component	XI	— Environmental Programmes: Selection, Implementation, and Evaluation.

Under each of the above Methods Component relevant competencies, content elements and some instructional recommendations are listed as possible structure to be developed further. Similarly, their relevance to elementary and/or secondary level is also indicated.

Implementation of Pre-Service EE Programmes

The incorporation of EE into preservice teacher training programmes requires policy decision making, changes in curriculum, in infrastructures, budget, and personnel. These changes are not easy to be brought especially at the university level where curriculum change can be like trying to move a cemetery. Despite this, the incorporation of environmental dimension in the programme, contents, and teaching methods of teacher training require definite changes for which ways and means should be sought. No fixed formula can be suggested to suit different institutions and educational institutions in different countries. Thus, the writers have identified twenty variables and a number of occasions to be considered for changing pre-service teacher training with respect to EE. They are as follows:

Variables

1. Person(s) to coordinate and plan for infusion (primary change agents)
2. Inside advocates
3. Faculty attitudes towards infusion of EE
4. Faculty possession of EE competencies
5. Administrative interest & support
6. Peer trainers
7. Consultants and EE specialists
8. Students
9. Faculty tenure & promotions
10. Faculty in-service mechanism
11. Internal funding
12. External funding
13. Existing institutional curriculum
14. Textbooks
15. Resource utilisation
16. Faculties
17. Supplies & equipment
18. Accreditation agencies
19. Regional/state/national education agencies
20. Labor/business, professional organisations.

Appropriate occasions to be utilised.

- | | | |
|--|---|--|
| Faculty meetings | — | Teacher in-service programmes |
| Book and materials selection | — | Institute days |
| Budget making | — | Evaluations, assessments |
| Professional conferences or conventions | — | Accreditation |
| Social occasions: picnics, dinner parties, luncheons | — | Unplanned meetings in lounge or halls |
| Lunch (in school) | — | Convocations or other university wide events |
| Coffee breaks | | |
| Negotiations | — | Equipment purchase or assignments |

Personnel selection or assignment	— Visitors from other universities from the community
Promotions	— Administrative meetings
Course changes	— Articles or announcements in professional journals
Curriculum revisions	— Publicity in local or regional papers
Library acquisitions: books, pamphlets, newspapers, professional journals	— Changes in legislation or policies
Grading or testing	— State and national meetings

In-service Teacher Training

1. Models for in-service training — In-service training programmes may utilise one of the following three models, or some modification or combination of them.

- a. Superordinate training
- b. Peer training
- c. Modular training

It is asserted that all three models have been used successfully.

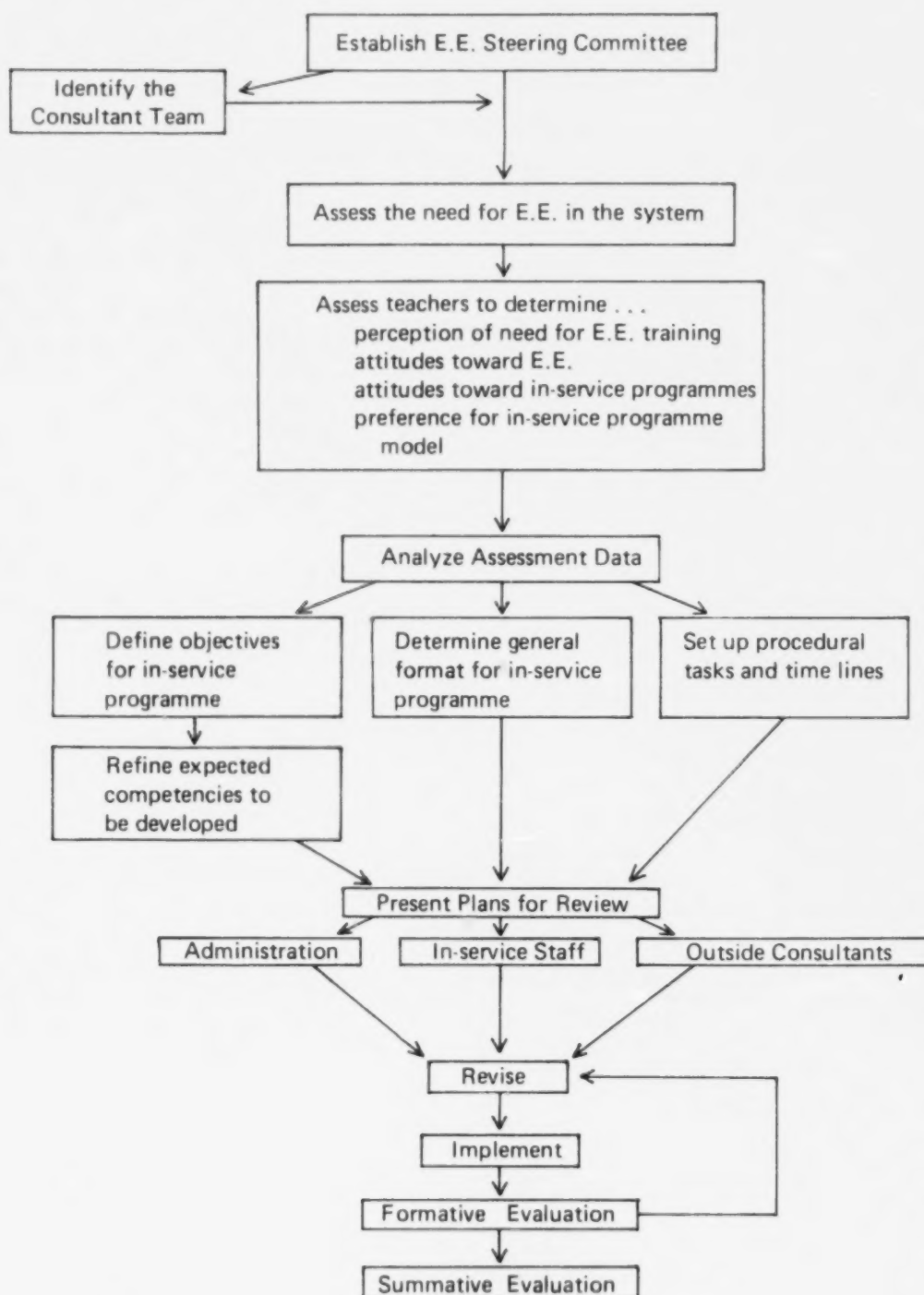
2. Guidelines for selecting in-service models — In the selection of a training model or a combination of them the following may be considered:

- a. objectives of the training programme;
- b. characteristic of the in-service population;
- c. available facilities.

3. Guidelines for designing in-service programmes — For effective and efficient in-servicing, planners must develop strategies for:

- a. assessing the needs and preferences of the in-service teachers and involving them in all dimensions of the planning process;
- b. securing the support of the administration (at all levels of the educational system) for the goals of the in-service programme;
- c. selecting competent trainers at any level who have adequate knowledge, skills, and the ability to establish rapport with trainees;
- d. providing adequate time for the effective completion of training;
- e. assuring that necessary materials will be available at appropriate times and in sufficient quantities;
- f. coordinating programme efforts between and within levels of the system;
- g. evaluating the process of the programme and revising plans accordingly.

4. Planning an in-service EE training programme – It may be achieved through certain steps shown in the chart as follows:



5. An eclectic model for in-service training – This model may be applicable in an educational system where interest in EE exists and needed funds for in-servicing area available. This model which combines the other three approaches is implemented in two years through five phases shown in the chart as follows:

